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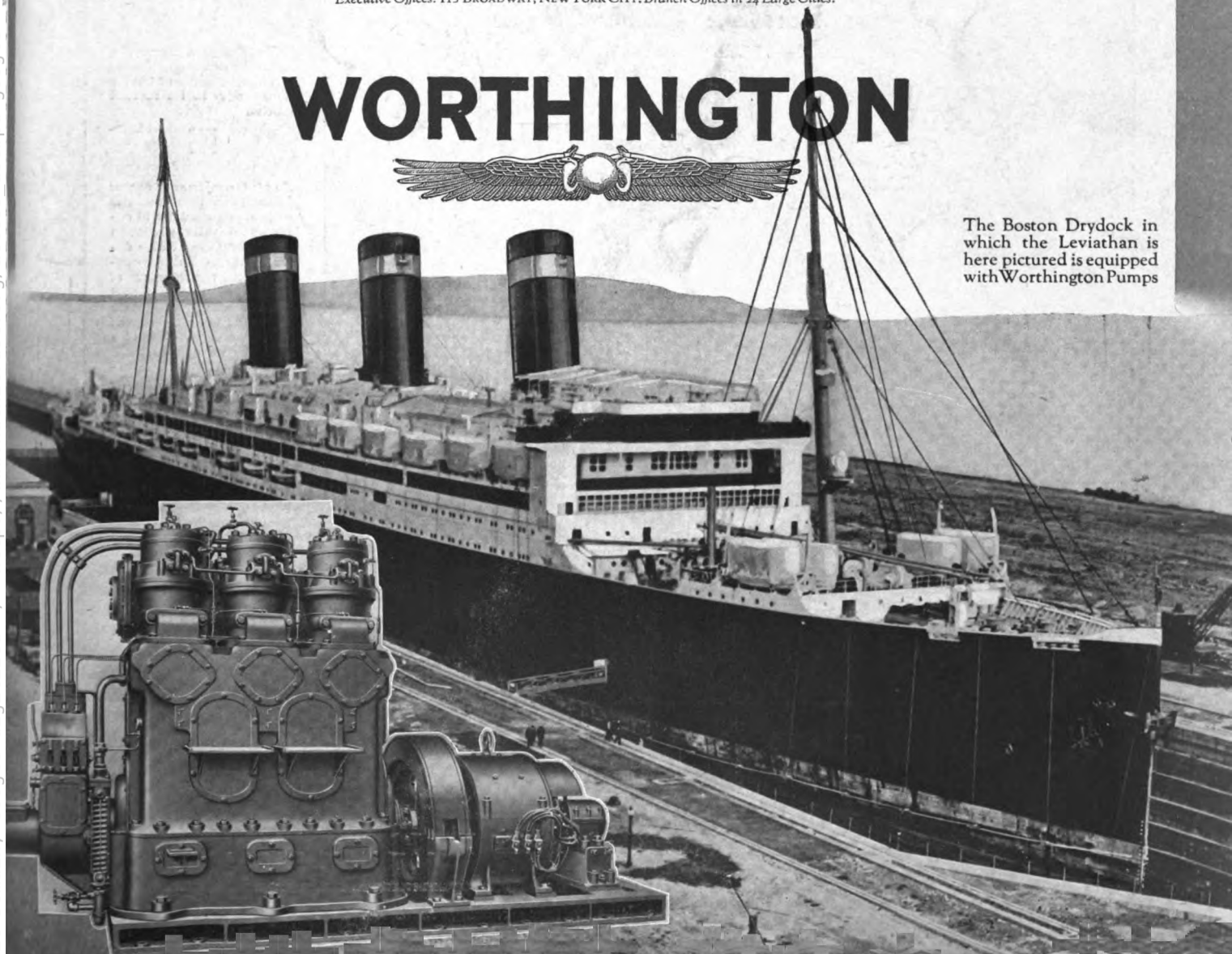
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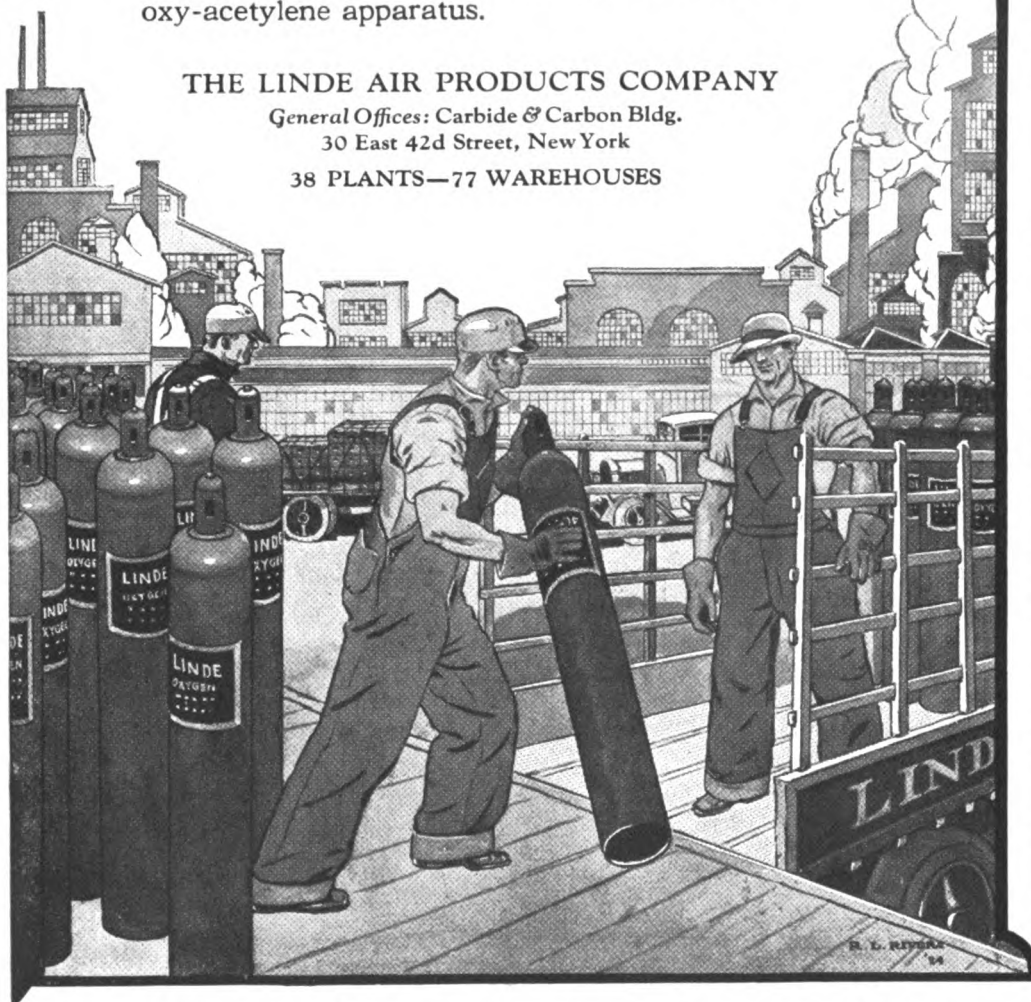
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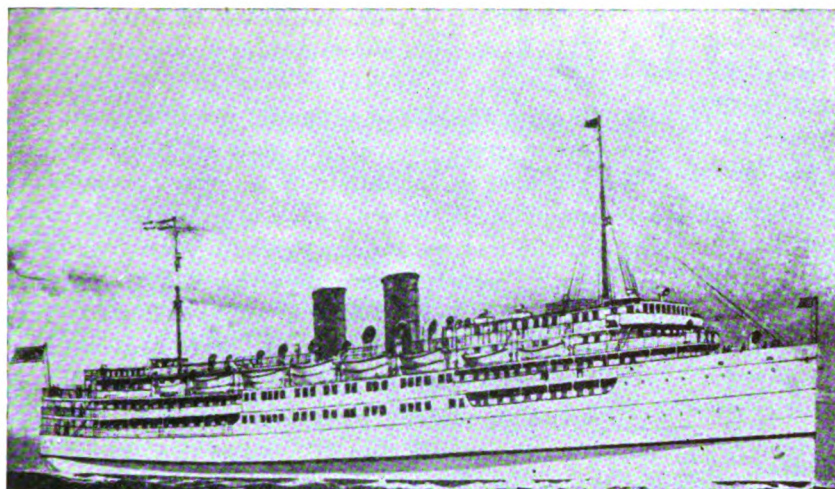


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Marine Review

August

1924

NEW COASTWISE LINER BOSTON

Victim of collision in a fog* July 21 with tanker Swiftarrow. Four were killed, all others being placed safely in lifeboats. The Boston was towed to shore and beached. Repairs will take three weeks.

Announce Plans for Diesel Conversion

By Our Washington Editor

PLANS, specifications and contracts for the program of conversion of 12 cargo vessels of the Emergency Fleet corporation to diesel propulsion this year are being actively prepared by the department of maintenance and repair of the corporation in New York, and it is the expectation that bids may be called for in about 90 days. Under present tentative plans, it is hoped by officials of the Fleet corporation that all contracts for the work will be in the hands of builders before the end of the year.

The work of preparing for this conversion presents a number of intricate problems. Under the so-called diesel engine measure, passed by the sixty-eighth congress as an amendment to the merchant marine act of 1920, the shipping board may set aside annually out of the revenues from sales and operations, a sum not exceeding \$25,000,000 to be known as its construction loan fund. This may be used for outfitting and equipment in private shipyards or navy yards of diesel machinery to replace the present motive power. The fund can be used to aid private owners or by the board for its own ships. The total expenditures of the board for its own use are limited to \$25,000,000 for the whole 5-year period.

About 375 vessels have been selected by the board as being most suitable for the installation of modern diesel propelling power. The use of funds under the diesel bill is to apply annually for five years, and plans of the board are to convert 50 to 60 vessels to diesel power in that time, about one-fifth of the conversion program to be undertaken the first year. It is conceded that the cost will be high, but it is pointed out that this type of propulsion may be expected to consume scarcely one-third of the fuel used by a steamship of equivalent power while at sea and only about one-tenth while in port. Economy in fuel, additional space resulting from reduced engine room, reduced personnel and consequent lowered cost of wages and subsistence, according

to a recent statement issued by the board, have been found in practice to absorb the cost of conversion in from six to seven years. On the other hand, the Fleet corporation is proceeding with considerable caution in the proposed conversion program and has set out to adopt only engines of proved type to furnish motive power for the freighters.

The Fleet corporation's vessels now are about five years old as an average and in fair state of preservation generally. With overhauling and installation of new machinery, it is pointed out that the market value of the vessels at the end of six or seven years, even with the probable improvement in the internal combustion engine art, might be greater than the value would be if the vessels were steamers. Diesel motive power first is to be tried out on ships of the Fleet corporation operated in long trade routes where speed results may undergo a more convincing test than in shorter routes.

Choose Type of Engine

Admiral William S. Benson has been placed in general supervision of the conversion program. Admiral H. I. Cone, as chairman of an advisory committee named by Admiral Benson to study the alteration plans, recently called a meeting of this committee which later submitted its final report. Predicated on an initial conversion program comprising 12 large single-screw freighters, the committee unanimously agreed that "this first step should be characterized by the utmost reliability, and accordingly recommended that only slow speed direct-connected engines of proved types should be used." The shipping board at the same time denied that manufacturers of double-action engines had made formal protest on the ground that such type of engines would be ignored in the installation program. "While recommending well-tried engines for immediate installation," a statement of the advisory committee said, "the committee sees the desirability of

encouraging the developing of the double-acting engine, and in view of its great advantages there is no doubt but this type will receive due consideration in the near future."

The engines required will be approximately 2500 to 2700 shaft horsepower at 90 to 95 revolutions per minute for a service speed of 11 knots. Herein, one of the problems of the conversion program presents itself. A survey of the industrial situation shows that but few marine engines have been built in this country with a horsepower above 1000 to 1200. Availability of plant resources of the country capable of furnishing 2600 to 3000 horsepower engines must be carefully considered, it is pointed out.

The WILLIAM PENN is the only vessel of the Fleet corporation completely outfitted with diesel machinery. It is operated under the MO-4 contract. Five or six other vessels are steam-electric driven, among these being the INVINCIBLE and the COURAGEOUS. Tests of the diesel-driven ship owned by the board showed that fuel consumption was fully 38 per cent less than the reciprocal, turbine or steam-electric drive.

Tentative plans are for the conversion of six of the 8800-ton type and six of what is known as the 9400-ton type to diesel propulsion this year. These selections have been made only tentatively and are subject to change pending further analysis of their adaptability to alteration for diesel equipment and machinery. Plans have been indefinite as to whether the vessels to be converted into motorships are to undergo complete electrification as to all machinery, but definite decision as to this policy will be made soon. Installation of auxiliary machinery presents another complex angle, inasmuch as considerable study must be given to the adaptability of the Fleet corporation vessels to alteration for this purpose.

The work of preparing for this conversion, together with supervision of construction and installation of all machinery and refitting of vessels, will be carried out directly under the supervision of the maintenance and repair department, of which Capt. R. D. Gatewood, U. S. N., is manager. All expenditures are to be subject to the approval of the shipping board, as well as the plans for the specifications and contracts. Actual plans, specifications and contracts are being prepared by the technical section of the New York office of the department of maintenance and repair. A. Conti has been retained by the shipping board as consulting advisory engineer.

The advisory committee named by Admiral Benson is composed of Admiral H. I. Cone, chairman; A. Conti, secretary; Admiral S. M. Robinson, William F. Gibbs, Capt. W. B. Styer, J. H. Nichols and Capt. Charles A. McAllister.

S. O. S. calls were sent out a few weeks ago by two steamers which were in dock at the time of the appeal for help. One vessel was on fire and the other was leaking. While some find amusement in the action of these two captains, practical European marine men see in the necessity for such action an urgent need for better communication between a berthed vessel and the shore. In the United States, temporary telephone connections are generally provided but in Europe this convenience and necessity is rarely made available for ship use.

War on U. S. Coastwise Law

ACTION of the Lamport & Holt Line, British owned, in carrying on its steamer VOLTAIRE, 550 members of the Elks from Philadelphia to Boston, where they attended a five-day convention, then hurrying them to Halifax and St. Johns and back to Philadelphia, is the most vigorous attack in years on the fundamental American doctrine of preserving our coastwise trade to our own ships. Whatever happened to our deep sea vessels, Americans always felt the coastwise trade was safe. The doctrine is as old as the country itself and it has made the United States the world's second largest shipping power, despite our weakness in overseas trades.

Of course the disguise for the VOLTAIRE's trip was that it was actually a voyage from an American to a Canadian port, the stopover at Boston being incidental. Actually, the stop at Boston was the inspiration for the trip, the quick run to a Canadian port being only a smoke screen. Government officials, who had warned the shipping line in advance of the trip, took that view and the company now carries a fine of \$110,000, at the rate of \$200 a passenger.

More is back of this test, than appears at first glance. Foreign shipowners have been restive under American competition since the war forced this country to build a huge fleet. In deep sea trade, private American owners, handicapped by our expensive regulations, have not fared so well. Only the shipping board vessels, backed by the federal treasury, have held out. But the coastwise trade has been active and in general more profitable than many overseas routes. If foreign vessels could break down the coastwise restrictions hundreds could find employment, undercut rates would retire the American vessels and in a few years this country would have no shipping instead of ranking second in tonnage. We would be only a figurehead in marine affairs.

Foreign shipowners have been active in the last year or two, having "international" conferences pass regulations in favor of freedom of trade. The resolutions sound well, and for those who have present strength and power, they are splendid. But for an outsider trying to establish himself, the resolutions mean that the tactics of today's leaders by which they won success, must not be repeated. Americans usually have not been at these conferences, but on at least one occasion, some Americans were carried away with the smooth sounding words and voted for them. They were private citizens so their action meant nothing except to reveal the ease with which they had been fooled.

One British shipowner, R. D. Holt, recently urged publicly that national discriminations should be ruled out and that all ocean trade, whether foreign or coastwise, should be open to every one. He felt that the British Empire could enlist Scandinavia, Germany, Japan, Holland and Belgium in such an agreement and together these countries "would then be in a position to compel every nation to throw open its trade to every flag."

It is obvious that Mr. Holt, when making this address as presiding officer of the powerful Liverpool Steamship Owners association had the United States in mind. So the VOLTAIRE test is a real test and a \$110,000 gamble is small compared with the ultimate stakes.

Completes 72 Years of Service

Merchants & Miners Line, Formed in 1852, Successfully
Adapts Itself to Changing Conditions—Meets Rail Competition

ADEQUATE transportation facilities are essential to the growth and development of trade, commerce and travel, and must be established prior to such interchange between communities. Once established the growth or decline of such facilities will depend in a great measure on the upward or downward trend of population, the natural resources and the energy and prosperity of the sections served.

Transportation must not only keep pace with immediate demands but also must be prepared for rapid expansion of trade and by being so prepared act as a stimulus to the development of new business. The Atlantic sea coast cities of the United States are the natural reservoirs of the industrial, agricultural and mineral products of their respective sections, and these cities are especially well served in both domestic and foreign commerce by elaborate railroad systems and numerous coastwise and foreign-going steamship lines. As the laws of the country prohibit foreign vessels from engaging in the coastwise trade all vessels in this trade are American built and owned, and they represent about 60 per cent of the total number and about 45 per cent of the total gross tonnage, of the active seagoing American merchant marine today.

Though there is active competition in coastwise shipping, it is on a basis of equality in operating expense for all, and on the whole the steamship lines en-

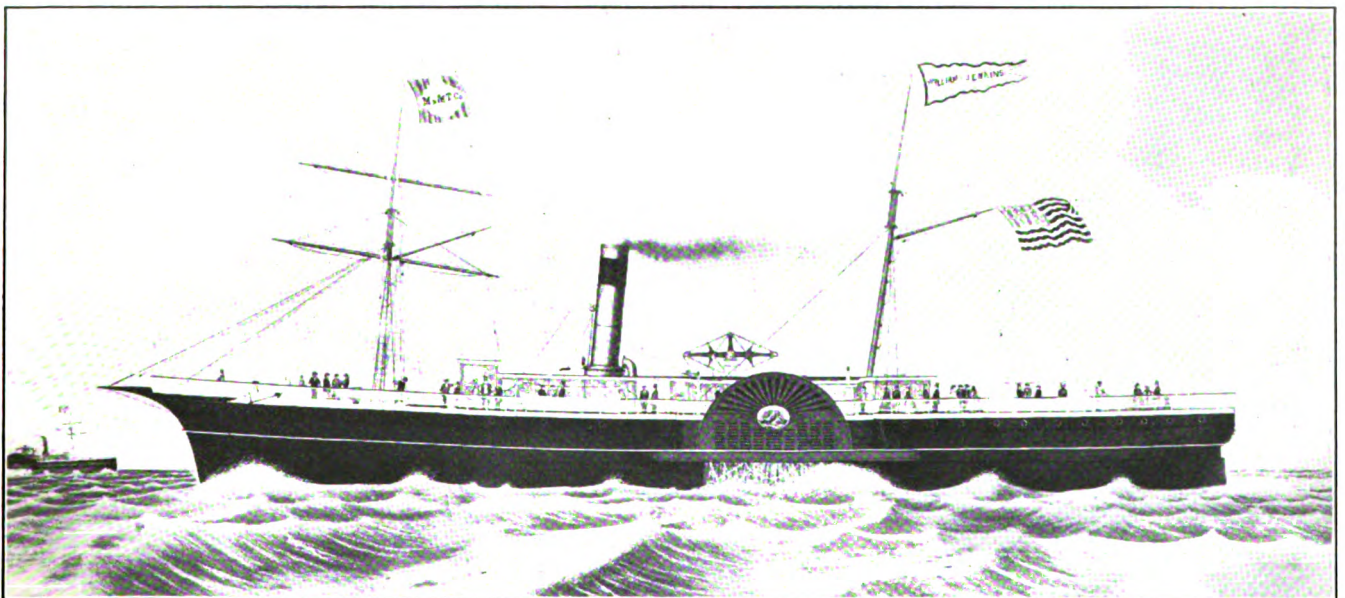
Some of the older American shipping and shipbuilding companies have successfully adapted themselves to the remarkable change in transportation affairs which began a half century or more ago. Striking changes in the same field are quite clearly coming in the near future so that a study of these past records will serve present day companies in planning ahead. Studies of other companies, similar to the accompanying, will follow in later issues.

gaged in this service are able to make a legitimate profit. This favorable condition, so different from the present plight of most American ships in the foreign trade, makes this section of the merchant marine the real backbone of shipping in the United States. A chance to make their living by following the sea is thus offered thousands of officers and men, and the ship repairs, upkeep and new building for replacements and additions, furnishes a nucleus of work for shipyards and repair plants, so that this industry is saved from nearly total extinction, pending the successful establishment of American vessels in the foreign trade. Foreign ships give only that repair work to American yards which cannot await return to the home

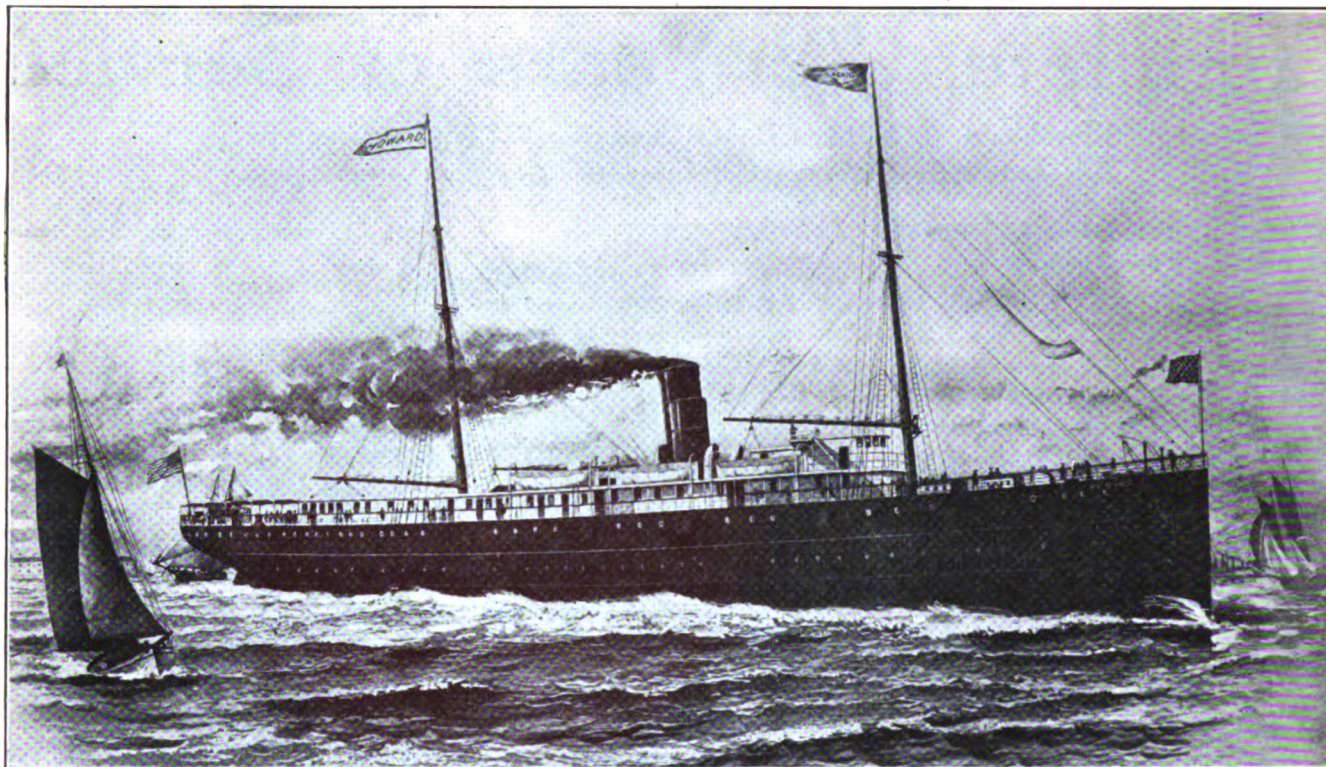
ports. One of the oldest coastwise steamship services is that of the Merchants & Miners Transportation Co., established in 1852 by business men of Baltimore and Boston, for the purpose of transporting general merchandise and mine products between Baltimore, Norfolk, Va., and Boston. Baltimore was then and is now the home of the headquarters of the company. From its origin to the present day, many advances in the art of shipbuilding have taken place as typified by the accompanying illustrations showing the first side-wheeler built of wood with a single expansion beam engine, one of the older iron hull steamers and the modern new oil burning steel sister steamships, the *BERKSHIRE* and the *ALLEGHANY*.

The service was well received and patronized from the very beginning, and the high reputation for fair dealing, reliability, expeditious movement of freight and care for the comfort and convenience of passengers, then established has continued up to the present day and is now a firmly rooted tradition. Step by step the company grew and prospered.

In 1859, seven years after founding the original service, a line was established between Baltimore and Providence, R. I. Serious interruption to the normal growth and activities of the company occurred during the Civil war, when one vessel was destroyed and two others were taken over by the government. At the close of the Civil war



WOODEN SIDE-WHEEL STEAMER WILLIAM JENKINS BUILT IN 1854, ONE OF THE EARLIEST OF THE MERCHANTS AND MINERS COASTWISE FLEET



STEEL STEAMER HOWARD, BUILT AT WILMINGTON, DEL., IN 1895 AND STILL IN ACTIVE SERVICE

the Baltimore-Boston line was re-established. Service between Baltimore and Providence, however, was not resumed until 1873. Appreciating the importance of the resumption of trade with the slowly recuperating South, a line was established in 1876 between Baltimore and Savannah, Ga. Several of the company's ships were again taken over by the government during the Spanish-American war, but the regular schedule was maintained without serious interference. The most active growth and expansion of the company commenced in 1900 when a line was established between Philadelphia and Savannah. This line and the one from Baltimore to Savannah were extended in 1905 to take in the growing city of Jacksonville, Fla. Two years later, in 1907, the service was extended to include a line between Philadelphia and Boston.



J. H. RUDOLPH
Chief engineer of line,
joined the company in
1893

Thus for 10 years prior to American participation in the World war, the services of this company included all important east coast American sea ports and centers of commerce with the exception of New York and the Carolinas, and extended over the entire length of Atlantic sea-

board from Boston to Jacksonville. These services were greatly reduced during the war due to the urgent need for ships, the government commandeering the company's entire property. Such services as were maintained were under government control and operation. All lines were re-established upon the return of its property to the company by the government.

Enters Passenger Field

Though originally established for the transportation of freight, it soon became apparent to the management that a profitable passenger business could be developed based on the universal appeal of ocean travel as a recreation and a pleasurable adventure, restful and beneficial physically and mentally. Consequently combination passenger and freight vessels built to provide every comfort and convenience for passenger travel were placed in service. Now in operation is a fleet of 17 ships as listed in Table II, 13 of these being combination passenger and freight vessels and 4 handling freight only. Table I gives the passenger and freight lines now being maintained on scheduled sailings. This completes a general outline of the origin and progress over nearly three quarters of a century, of a coastwise steamship company which may fairly be called a pioneer in the establishment of regular ocean service for passengers and freight between New England through Boston and Providence and the South and West through Baltimore and the ports of Newport News and Norfolk, Va.

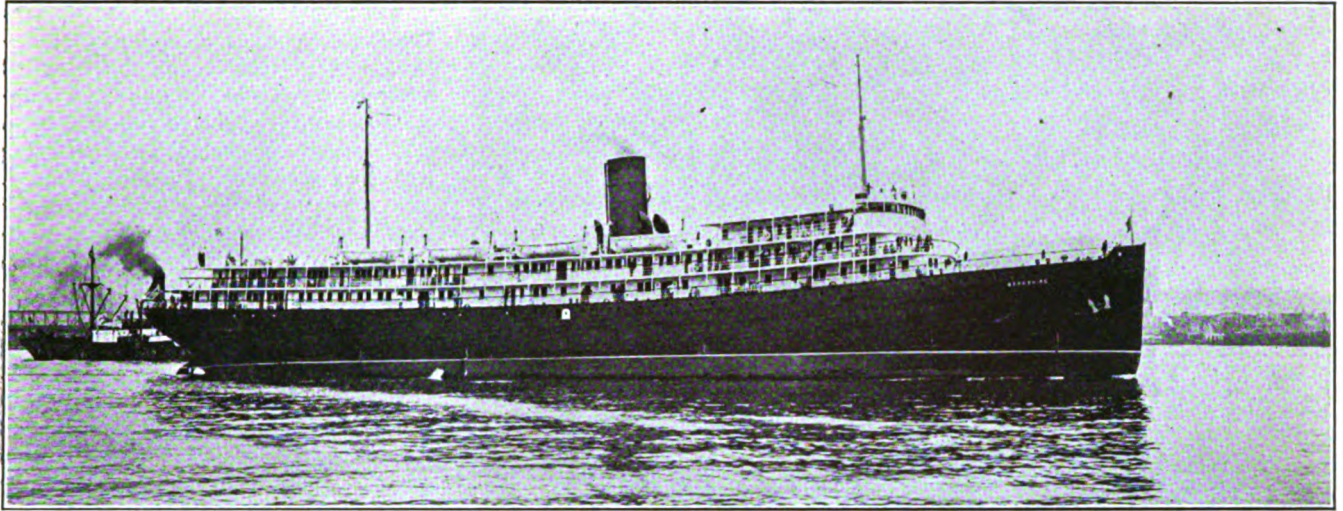
Until the advent of the railroads, persons traveling between the coast cities whether on business or pleasure had their choice of going overland by stage coach or by boat along the coast without much difference in time. The choice now lies between railroad and steamship but with a differential in time of from 1 to 5 or 6 in favor of the former.

Steamships in the longer coastal runs cannot, therefore, compete with the railroads for travelers who are bound on business. In a well-to-do and populous country such as ours, however, a great number of people travel for recreation and pleasure and many of this class prefer the freedom, exhilaration and interest of going by steamer.

The actual expense of traveling in this manner with accommodations and meals included is less than by rail. Consequently the Merchants & Miners Transportation Co. has found it necessary in order to meet this demand steadily to increase the total of passenger accommodations in its fleet and this branch is now a large and profitable part of the total business. The combined passenger ca-



W. J. BOND,
Senior captain who
joined the company in
1881



STEAMER BERKSHIRE, LATEST TYPE OF VESSEL BUILT FOR COASTWISE SERVICE

capacity of the fleet is at present 1737, including the two latest, largest and finest ships, the ALLEGHANY and the BERKSHIRE. The total number of passengers carried on all lines of this company in 1923 was 50,198. Figures for the first six months of 1924 are not available.

How Business Is Influenced

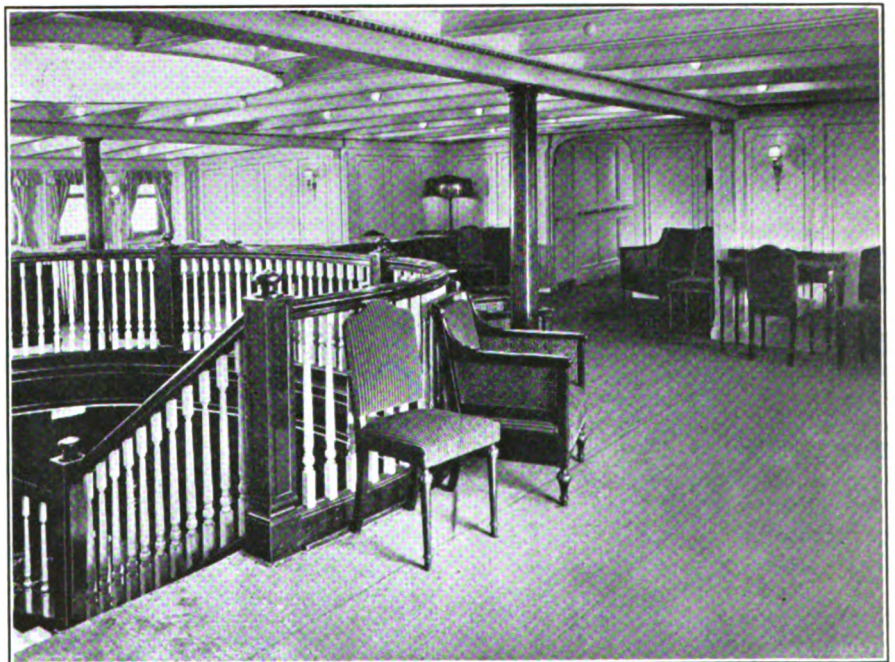
Broadly considered, there are three conditions which largely affect the growth of this business. 1. What is known as good times, which means widespread and general prosperity. Over this condition, of course, the steamship company and its management can exercise little influence. 2. The historic interest, educational, cultural, climatic, natural and artificial attractions of the cities and surrounding communities between which the services are operated. In this respect the company is particularly fortunate as in all these their different routes present much to interest the traveler. 3. Maximum of service at reasonable rates. In this the management is solely and directly responsible in providing good ships with clean, well ventilated, comfortable staterooms, promenade decks and spacious and tastefully appointed public rooms, the best of food well prepared and served, efficiency and courtesy on the part of all the personnel, so that at the end of the voyage everyone will have only the pleasantest recollections of the trip. A quality service of this sort will establish for a line a high reputation which is found to be reflected in increased business.

The two latest ships added to the company's service, the sister steamships ALLEGHANY and BERKSHIRE, built by the Federal Shipbuilding Co., Kearny, N. J., completed in the summer of 1923, were especially designed for this service and incorporate in every detail the long ex-

perience of the management in providing for the safety, comfort and recreation of passengers. They are single screw, oil burning ships 368 feet in length, 52 feet in beam with 7000 tons load displacement. There are one, two and three-passenger staterooms each equipped with hot and cold running water, some with bathrooms, others with showers and toilets and others with toilets only. Staterooms have electric berth lights and telephones. The social halls, lounges, smoking rooms and music rooms are large and roomy and are attractively furnished and appointed in simple good taste. Some conception of these ships and their public rooms and typical staterooms may be had from the accompanying illustrations. A particularly attractive feature are the long, wide open decks for promenading and

for steamer chairs. These two latest ships are modern and up-to-date in every respect. Automobiles are carried, open types on all ships and enclosed on the two new vessels. All-expense tours are operated and the passenger travel is growing. Other vessels of the fleet though older are comfortable and staunch ships and have received careful attention in the matter of renovation, repairs and upkeep. The time must soon come, however when further additions or replacements to the fleet in the way of new ships will be necessary.

A look at the map published herewith will show at a glance the ports served by regular scheduled sailings of the company. It may fairly be said that no other section of the country is better served by efficient railroad systems than the eastern seaboard and the ad-



MUSIC ROOM ON THE STEAMER BERKSHIRE



DINING ROOM ON THE STEAMER ALLEGHANY

jacent interior. On what basis then can this coastwise steamship company compete with the railroads for the movement of all kinds of goods and merchandise?

How Rail Competition Is Met

The fact that a large volume of freight is moved in its ships and that these ships operate profitably is in itself convincing evidence that they are able to compete with the rail lines, not only directly between the ports from which they have sailings, but also between many other widely separated communities in the interior, by part rail and part water transportation instead of an all-rail movement. In short, the reason for this is that the ships are able to quote equal and in most instances better rates and at the same time give good service. Time of delivery is reduced because of frequent regular sailings. There is a greater certainty of delivery within the specified time and also greater security against loss and damage.

Strange as it may seem, a firm in Chicago buying f.o.b. cars in some town in the extreme western end of the state of Massachusetts, or in the central and northern part of New Hampshire or in Maine may find it more advantageous to ship by boat from Boston to Norfolk or Baltimore and thence by rail to Chicago than all the way by rail.

The freight business of the company may be divided into business which originates and terminates in the ports between which regular sailings are maintained, business from or to interior

points transhipped from rail to steamer and again from steamer to rail, or business originating in the interior transhipped from rail to steamer and terminating at port of destination of steamer. Due to the greatly increased use of motor trucks large shippers and receivers located in or within a considerable radius of the larger cities which are also sea ports, truck their goods to or from the steamship terminals and consequently business originating and terminating in cities such as Boston, Philadelphia and Baltimore has grown to large proportions.

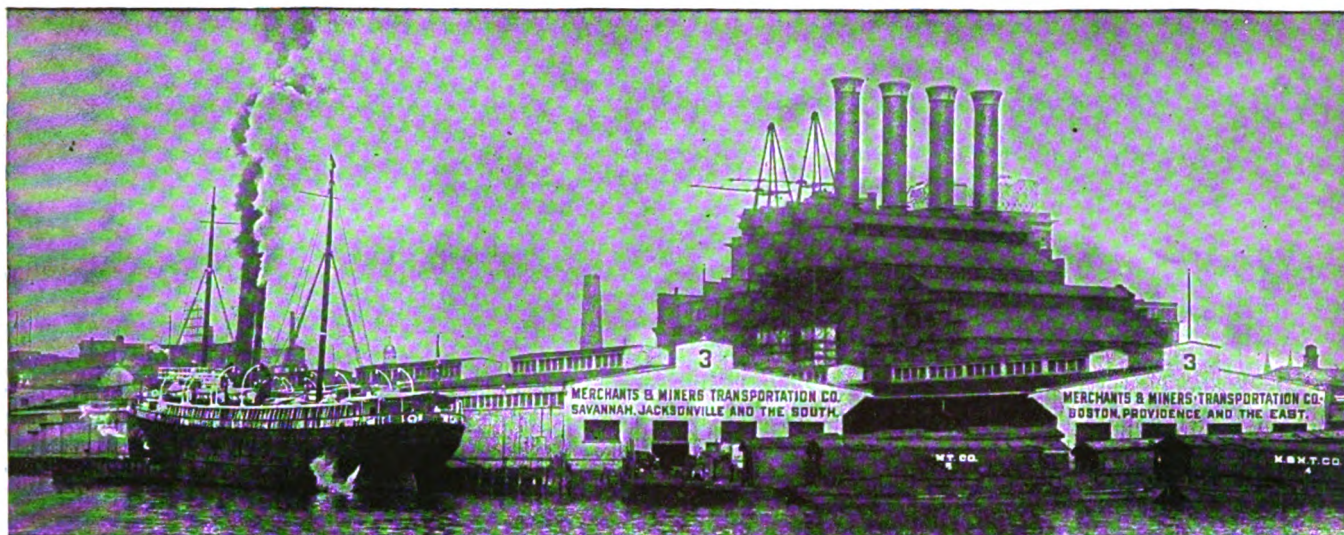
Where shipments may go all the way by water, it would hardly seem necessary to urge shippers or receivers

to use this method as the advantages are so evident. If a shipment is delivered to the pier before the specified hour for closing out freight, that shipment whether a single package or a car load lot is placed on board the particular ship for which it is intended. The ship leaves at a stated definite time and arrives at its port of destination with uniform regularity practically on the hour scheduled. A ship is an individual entity and the exact time of its departure and arrival is easily ascertainable. There is therefore, a well founded feeling of definiteness and certainty about all shipments by steamer which in the nature of things can not be so in regard to shipments by rail. Though railroads are responsible for damage or loss through causes over which they have control and meet this responsibility readily with a minimum of inconvenience to the owner, the corresponding rates by water generally include marine insurance.

Several typical examples showing the advantages of direct by water transportation may be given. A steamer leaving Boston at 4 p.m. on Tuesday is due in Philadelphia on Thursday at 7 a.m., an elapsed time of 39 hours, which means that the products of a factory outside of Boston, let us say a shipment of shoes or rubbers, may be moved from the shipping room of that factory to the receiving room of a department store in Philadelphia within a period of two days. The rates from steamship terminal in Boston to steamship terminal in Philadelphia will be 61½ cents per 100 pounds including marine insurance. By rail, the charges would be 66½ cents per 100 pounds. The time by rail at best



SOCIAL HALL ON THE STEAMER ALLEGHANY



BIG TERMINAL OF THE MERCHANTS & MINERS TRANSPORTATION CO. AT BALTIMORE

will not be less than the time by steamer which within close limits is always the same except under extraordinary circumstances.

A steamer leaving Boston at 4. p.m. on Tuesday will arrive in Norfolk on Thursday at 9. a.m. after an elapsed time of 41 hours. It would therefore, be possible to make delivery from factory near Boston to store in Norfolk within two days. The rate per 100 pounds from port to port is 81½ cents. By rail for the same class of goods, the freight charges would be 86½ cents per 100 pounds. The time by rail under ordinary conditions would be 4 days. The same steamer with a seven-hour lay over at Norfolk will reach Baltimore at 7 a.m. on Friday an elapsed time of 63 hours. Delivery can therefore be made of a shipment from factory near Boston to store in Baltimore within three days, at a charge of 73 cents per 100 pounds from port to port. The rail charge on such a shipment would be 78 cents per 100 pounds, and the time of delivery would be about the same or a little longer.

On the southern run, the elapsed time from Baltimore to Savannah is 61 hours, and to Jacksonville allowing for a 10-hour lay over in Savannah is 85 hours, which means that a shipment from Baltimore to Savannah can be made within three days and to Jacksonville within four days. The charges on clothing for instance from Baltimore to Savannah would be 99 cents per 100 pounds and to Jacksonville \$1.16 per 100 pounds without marine insurance while the corresponding rates by rail would be \$1.65½ to Savannah and \$1.65½ to Jacksonville. By rail the time from Baltimore to Savannah and to Jacksonville would ordinarily be four days and five days respectively.

From the above taken by itself the impression created might be that the steamship company and the railroads are bitter unrelenting competitors each presenting to the shippers and receivers the advantages of their respective services to gain patronage. There is direct competition of course but in most instances of this sort the advantages are so clearly with the steamship lines that the railroads accept the decision with equanimity. On the other hand, with respect to a large volume of freight business there exists the friendliest co-operation, each acting as a feeder for the other and as a necessary and useful link in the economical and expeditious movement of freight.

In this way, the steamship company in conjunction with the rail lines moves a great deal of freight between many points in New England and points in the west, south and southwest. Such freight is carried to Boston and Providence by rail and thence by steamer to Norfolk, Newport News and Baltimore where it is again transhipped by rail to its destination. In a similar manner, freight originating in the south and southwest bound for the middle atlantic states is shipped where the point of origin is favorable to this route, to the southern ports by rail thence by steamer to Baltimore and Philadelphia where it is transhipped by rail to points of destination. Where

Table I

Freight and Passenger Service of the Merchants and Miners Transportation Co.

Distances and Sailings Between Ports

	Miles	Hours	Sailings Each Week
Boston and Norfolk	533	41	Three
Boston and Philadelphia	474	39	Three
Boston and Baltimore	705	55	Two
Providence and Norfolk	413	32	One
Providence and Baltimore	585	45	One
Philadelphia and Boston	474	38	Three
Philadelphia and Savannah	710	55	Two
Philadelphia and Jacksonville	853	66	Two
Baltimore and Boston	705	54	Two
Baltimore and Providence	585	45	One
Baltimore and Savannah	629	50	Two
Baltimore and Jacksonville	772	62	Two
Baltimore and Norfolk	172	14	Three
Norfolk and Baltimore	172	12	Three
Norfolk and Providence	413	30	One
Norfolk and Boston	533	38	Three
Savannah and Baltimore	629	50	Two
Savannah and Philadelphia	710	52	Two
Savannah and Jacksonville	143	12	Four
Jacksonville and Baltimore	772	62	Two
Jacksonville and Philadelphia	853	66	Two
Jacksonville and Savannah	143	12	Four

Table II

Ships Owned and Operated by the Merchants and Miners Transportation Co. August, 1924

Name of Steamer	Length feet	Beam feet	Passengers			Gross	Tonnage		Where Built	When
			Cabin	Others	Speed knots		Net	Deadweight		
Alleghany.....	368	52	205	24	12	5486	3261	3300	Federal S. B. Co.	1923
Berkshire.....	368	52	205	24	12	5486	3261	3300	Federal S. B. Co.	1923
Cretan.....	285	40	83	13	11	2350	1651	2500	J. Roach & Son	1882
Dorchester.....	282	40	87	0	12	2537	1875	1800	Harlan & Hollingsworth	1889
Essex.....	318	40	99	0	12	3018	2155	2721	Wm. Cramp & Sons	1890
Gloucester.....	296	42	150	0	12	2541	1976	2500	Maryland Steel Co.	1893
Grecian.....	290	42	105	0	12	2827	1994	2558	Harlan & Hollingsworth	1900
Howard.....	333	42	114	16	12	3581	2278	3056	Harlan & Hollingsworth	1895
Indian.....	289	38	Freight only		11	1955	1135	2503	Harlan & Hollingsworth	1890
Juniata.....	333	42	132	9	12	3465	2537	3056	Harlan & Hollingsworth	1897
Kershaw.....	298	42	Freight only		13	2741	1654	2316	Harlan & Hollingsworth	1899
Merrimack.....	298	38	95	0	11	2546	1879	2400	Harlan & Hollingsworth	1879
Nantucket.....	298	42	133	0	13	2599	1767	2436	Harlan & Hollingsworth	1899
Ontario.....	315	42	128	0	13	3099	1952	2580	N.Y. Shipbuilding Co.	1904
Persian.....	311	40	115	0	11	2677	1890	2600	J. Roach & Son	1882
Quantico.....	311	40	Freight only		11	2461	1391	2600	J. Roach & Son	1882
Tuscan.....	290	42	Freight only		13½	2415	1335	2813	Maryland Steel Co.	1907
Totals—13 Pass. & 4 Frt. Ships...			1651	86		51784	33991	45039		

Note—All of these ships are driven by reciprocating steam engines. Coal is used for fuel, except for the Berkshire and Alleghany which use fuel oil.

such freight and also freight from the west is bound for New England it is transhipped from rail or steamer at these ports and at Norfolk or Newport News for Boston or Providence and thence by rail or other steamship lines to points of destination in the interior or to ports of Maine and Canada.

To show the quick despatch and with few exceptions, the lower rates applying to shipments between New England and many distant and widely separated points by using steamer and rail instead of all rail a few definite examples may be given. For instance, freight falling within the first classification of the regular rail tariff schedule, shipped from Boston or Providence via steamer to Norfolk, Newport News or Baltimore as the case may be and then transhipped to the points listed below will take the time indicated for delivery and the rates shown per 100 pounds. For comparison all rail rates and time of delivery to the same points are also shown as follows:

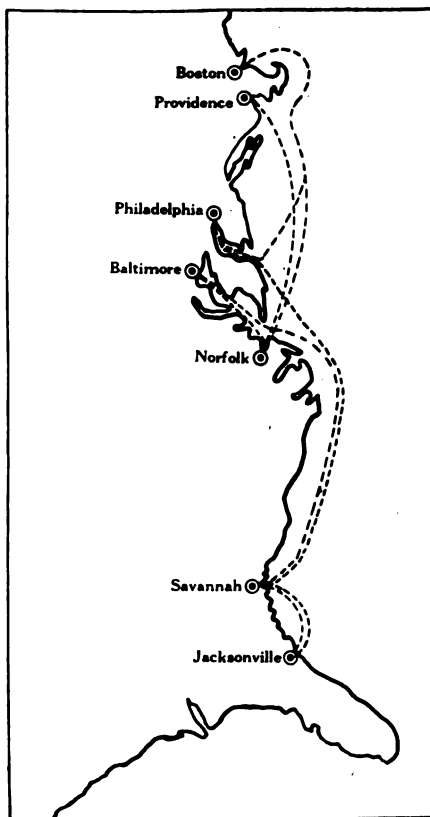
FROM BOSTON AND PROVIDENCE

(Rates include marine insurance)
(Via water and rail) (Via all rail)

To	Rates in cents per 100 lbs.	Due to Rates arrive in cents day	Due to Rates arrive in cents day
Akron, O.	101	6th	101
Charleston, W. Va.	109½	7th	121½
Indianapolis ..	125	6th	132
Jonesboro, Ind. ..	128	8th	135
Milwaukee	135	7th	142
*Chicago	135	6th	142
Peoria, Ill.	149	8th	156
Denver, Colo. ...	392	10th	412
Salt Lake City, Utah	490	12th	510
Tulsa, Okla.	270	10th	33½
Atlanta, Ga. ...	187½	4th	196½
Birmingham, Ala.	195	5th	204

Goldsboro, N. C. 133 4th 140½ 5th
Clinton, S. C. 166½ 6th 173½ 6th
*129 cents, summer rate.

From the examples given in the above table, picked out at random, but to



MAP SHOWING PASSENGER AND FREIGHT ROUTES

cover widely separated and distant points and without knowledge, at the time of choice, of the difference in

rates and time of delivery as between transportation by water and rail and all rail, it is clear that a marked advantage in rates rests with the former route, while to points west an advantage generally of one day in time of delivery rests with all rail. To points in the south, however, both rates and time of delivery are considerably lower for a combination of rail and water than by all rail.

Beside the regular freight service as described above, the steamship company offers to shippers and receivers an express service giving store door delivery. Two express companies operate over its lines, one between Boston, Providence, Philadelphia and Baltimore, Coastwise Express, with store door delivery and the Southeastern Express between Boston and Providence and points on the Southern railroad.

During 1923 a total of 1,033,969 tons of freight moved over the company's lines. Though the exact figure of the total tons of freight moved in the first six months of 1924 is not available, the chances are that it will not equal the amount for the same period of 1923, as general business was not as good. Growth of the company's business in the future as conditions in industry and commerce improve is looked forward to with confidence. This arises from efficient operation and because a real service is rendered shippers, and excellent opportunities for delightful travel by sea at reasonable rates are offered to passengers.

Tests Steel Plates of Leviathan

Chemical and Physical Investigation of German Made Plates
Fails To Show Clearly Why They Have Resisted Corrosion So Well

BY DR. G. B. WATERHOUSE

WHILE the story of the LEVIATHAN is familiar to almost everyone a little of her history may be repeated. She was completed in 1914 at the yards of Blohm & Voss in Hamburg under the name of VATERLAND. At the beginning of the World war she was at her pier in Hoboken, N. J., and remained until some time after, being taken over by the United States navy in April, 1917. Her first trip as a transport began Dec. 15, 1917, and she was drydocked at Liverpool early in 1918. Her last trip as a transport ended Sept. 9, 1919, when she was again laid up at Hoboken. After considerable delay in regard to policy the contract for her reconditioning was awarded to the Newport News Shipbuilding & Drydock Co., Feb. 15, 1922. In April, 1922, she arrived at Newport News under her own power and left May 16, 1923, bound for Boston where she was drydocked May 18 in the only dry dock in the United States large enough to accommodate her. On July 4, 1923, she left on her maiden trip under the United States flag as a merchant ship. A complete and well illustrated account of the ship and her reconditioning appeared in a special issue of MARINE REVIEW July, 1923.

It will be noticed that over five years elapsed between drydocking at Liverpool and at South Boston, during which time no attention or care could be given to the hull plates. Nevertheless it was found that the bottom was in remarkably clean condition, the hull being free from marine growths, pitting and corrosion. While the ship was at Liverpool five years before, a skeg of English steel plates was rivetted to the stern for carrying a part of the rigging for the paravane or otter gear, a mine

Why This Resistance to Corrosion?

WHEN the S. S. LEVIATHAN was drydocked at Boston, it was found that the original German plates had resisted the corrosion of sea water much better than a number of plates of English manufacture which had been installed at Liverpool in 1918. A. H. Jansson, associate editor of MARINE REVIEW, reported the facts to Dr. G. B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, who tested samples of both steels. The results, which are described by Dr. Waterhouse in the accompanying article, do not clearly indicate why the German steel resisted corrosion more successfully during 10 years of service than the other steel in 5 years.

Dr. Waterhouse's conclusions suggest interesting questions. Is the presence of more copper in the original steel responsible for its greater resistance; does the banded structure account for it; or does some other factor, not revealed by the tests, hold the key to the problem?

sweeping device invented, supplied and installed by the British government. In contradistinction to the plates of the hull this skeg or paravane gear was found to have been badly attacked by the continuous submersion in sea water, without attention for over five years. These facts regarding the steel plate were brought to the author's attention by A. H. Jansson, associate editor of MARINE REVIEW, and by Prof. James R.

Jack, head of the department of naval architecture at the Massachusetts Institute of Technology. It was felt that an investigation of the steel plate, particularly of the German steel, would be of interest, and through the courtesy of the commandant and officers of the United States navy yard, Boston, samples were secured for examination.

Two samples of the German steel were obtained. They were oval in shape, about 18 x 20 inches. One was about 1 3/16 inches thick and the other about 1 5/16 inches. They may be called samples A and B. The physical testing was done by men accustomed to making and handling steel plate and thanks are due to A. L. Meyer, metallurgical engineer, Alan Wood Iron & Steel Co., and to William G. Humpton, engineer of tests, Lukens Steel Co. for their co-operation.

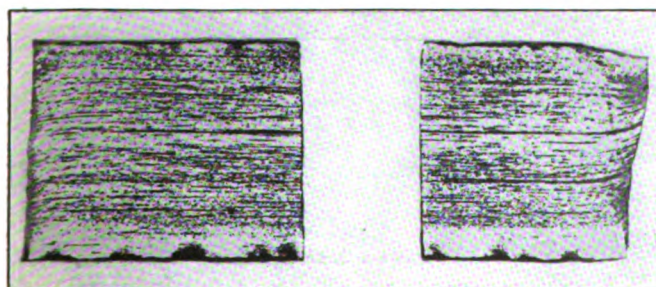
The chemical analyses were as follows:

	Sample A	Sample B
Carbon	0.16	0.15
Manganese	.65	.57
Phosphorus	.42	.034
Sulphur	.069	.057
Silicon	.006	trace
Copper	.169	.134
Nickel	nil	nil
Chromium	.013	no
Vanadium	nil	nil

The samples did not show any aluminum, titanium, molybdenum or zirconium. The analyses indicate ordinary steel, rather high in sulphur, except for a high percentage of copper either introduced purposely or present in the steelmaking charge.

The results of the physical tests are as follows::

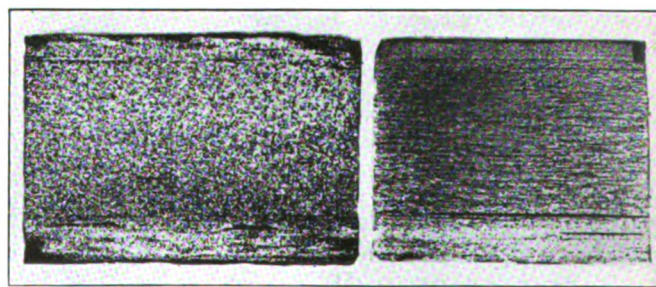
	Sample A	Sample B
Long. Trans. Long.		
Yield point, pounds per, square inch	37,950	37,100
Ultimate stress, pounds per square inch.....	63,200	63,300
Elongation, per cent in 8 inches	27	25



Transverse

Longitudinal

FIG. 1—SAMPLE A



Transverse

Longitudinal

FIG. 2—SAMPLE B

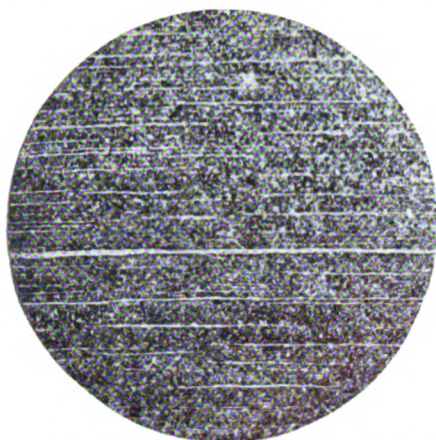


FIG. 3—SAMPLE A, TRANSVERSE. X 10

Reduction, per cent 49.2 51.9 56
Bend 180° flat 180° flat

In addition tests were made on the *B* steel, both in the longitudinal and transverse directions after turning down to 0.505 inches diameter and 2 inches long. These results were as follows and show clearly that the *B* sample is higher in carbon toward the center:

Tensile Tests (Small)	Sample B	
	Long.	Trans.
Ultimate stress, pounds per square inch	60,000	58,500
Elongation, per cent in 2 inches	34	36
Reduction, per cent	57.5	50
Bend	180° flat	180° flat

The tensile test results show good material with higher ultimate stress than would be expected in this thick plate from the carbon content. The fractures were gray granular with silky edges.

Samples were machined from the test pieces for microscopic investigation. The microscopic results are shown in Figs. 1 and 2.

These indicate a banded structure, particularly in the case of *A*. This is brought out more clearly in the samples magnified 10 diameters, after etching with dilute nitric acid in alcohol, as reproduced in Figs. 3 and 4. It also is noticeable in the microphotographs magnified 100 diameters. The higher magnification also shows a rather coarse structure, as well as many nonmetallic impurities or sonims. Figs. 5 and 7 par-



FIG. 4—SAMPLE B, TRANSVERSE. X 10

ticularly show these sulphate inclusions. The interesting features of the microstructure are the open structure showing finishing at a high temperature, the presence of numerous non-metallic inclusions, and the well marked banded structure.

Tests of English Steel

The English steel was about $\frac{3}{4}$ inch thick. The chemical analysis is as follows: Carbon, 0.14; manganese, 0.37; phosphorus, 0.057; sulphur, 0.053; silicon, 0.011; copper, 0.099; nickel, trace; and chromium, nil. The physical results on the full size and small test pieces are as follows:

	Full size	Small size
Yield point	37,260	36,500
Ultimate stress	56,740	61,750
Elongation, per cent	22.5	32
Reduction, per cent	52.5	57.5

In all cases the fracture showed gray granular with silky edges. The longitudinal specimens were bent flat on themselves. The transverse specimens were bent 180 degrees round a pin equal in diameter to the thickness of the specimen. With further reductions cracks developed on the outside. The microstructure was normal, agreeing with the analysis. Judging from the high phosphorus the steel would appear to be acid open hearth, and notwithstanding the rather high sulphur the structure shows a comparatively clean, good steel.

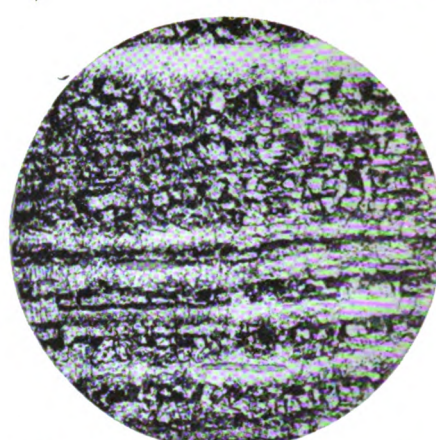


FIG. 5—SAMPLE A, TRANSVERSE. X 100

A careful investigation of two samples of German plate from the hull of the *LEVIATHAN* does not give clear evidence as to why this steel resisted corrosion in sea water so well. Possible reasons, however, are the presence of a comparatively high percentage of copper, and a marked banded structure whereby after moderate corrosion low carbon layers would be exposed to the sea water. It is noticeable that this steel is rather open and coarse in structure and has good physical properties. It is not a "clean" steel, in the language of the steelmaker, but contains numerous nonmetallic inclusions. The English steel, which suffered badly from corrosion, appears to be ordinary acid open hearth with no marked characteristics to distinguish it from ordinary plate except that copper is present in moderate amount.

The oil engine-electric tugboat, *VAN DYKE II*, was launched in July by the Staten Island Shipbuilding Co., Staten Island, N. Y. This is the second of three oil engine-electric tugboats building for the Atlantic Refining Co., Philadelphia, the *VAN DYKE I* being launched in June. Each tug boat will be equipped with two 225 horsepower Ingersoll-Rand type oil engines direct-connected to General Electric type generators and driven by a General Electric motor.

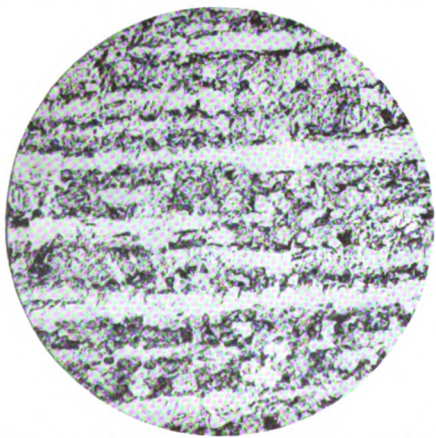


FIG. 6—SAMPLE A, LONGITUDINAL. X 100

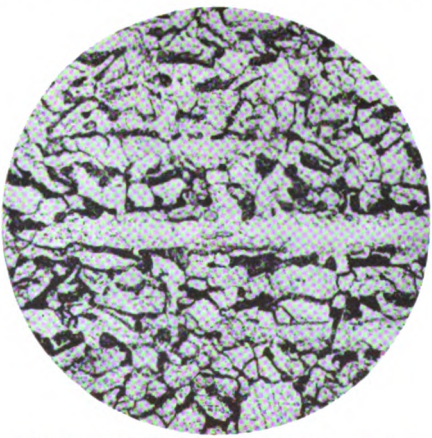


FIG. 7—SAMPLE B, TRANSVERSE. X 100

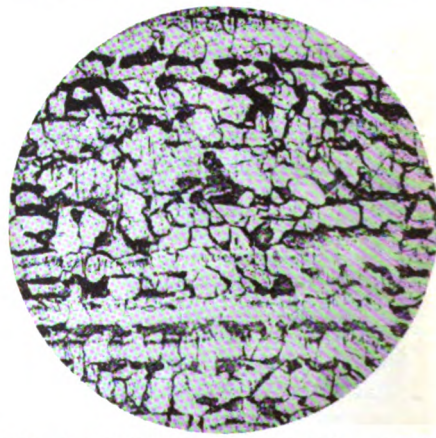


FIG. 8—SAMPLE B, LONGITUDINAL. X 100

Choosing Auxiliaries for a Motorship

DECIDING on a diesel type engine for the main drive of a ship does not in itself preclude the use of steam for auxiliaries though recent experience clearly demonstrates that it should. For ultimate economy in operation where a diesel engine is installed for the motive power, auxiliary diesel generating sets should be used for developing electric current to be used for driving all auxiliaries, thus completely eliminating steam with the possible exception of a small steam heating plant.

The introduction of the diesel engine, therefore, has had a powerful effect on the development of individual electric motor driven auxiliaries. Before this, though the advantages of individual electric drive for machines in shops, factories and industrial plants ashore were fully recognized, and such installations were considered up to date practice, there had been practically no acceptance of this principle on board ship. The initial expense involved in supplying and installing a generating set of sufficient capacity and also the expense and untried and uncertain operation of the various auxiliaries adapted to individual motor drive, more than offset the gain in fuel economy in the judgment of the owners.

On diesel driven ships, however, the discrepancy in total fuel consumption, as between half dieselizing the ship as it were, that is, using ordinary steam driven auxiliaries, and complete dieselization, or generating electric current with a diesel engine and using individual motor drive for auxiliaries, was so glaringly in favor of the latter that no difference of opinion could exist as to the wisdom in making a

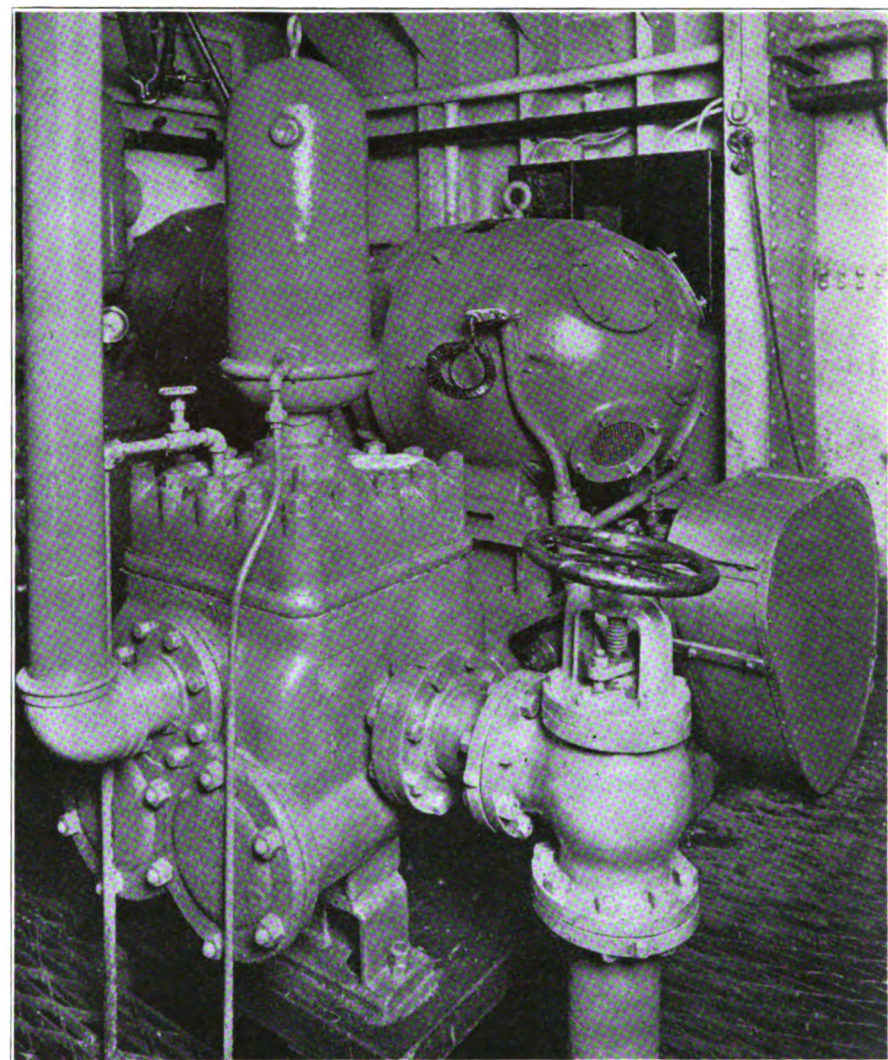


FIG. 1—A 6 X 12-INCH ELECTRIC MOTOR DRIVEN DUPLEX, DOUBLE ACTING FIRE AND BILGE PUMP INSTALLED ON MOTORSHIP SUPHENCO

clean sweep of steam driven auxiliaries. The manufacturers of auxiliary equipment for ships, fully aware of this trend, have carefully studied the requirements and as a result are now prepared to supply complete individual motor drive auxiliaries for all purposes on board ship.

Tells of Pump Installation

On account of comparatively recent development and the tendency in most descriptions of diesel ships to dismiss the auxiliaries by merely listing them and giving their sizes, it seems distinctly worth while at this time to give illustrations of and complete information on certain engine room auxiliaries. For this purpose, two of the electric motor driven pumps installed on the freighter motorship SUPHENCO, typical of an up to date pump equipment for a completely dieselized ship, have been chosen.

The accompanying illustration Fig. 1 shows the electric motor driven fire and bilge pump as installed on board, while Fig. 2 shows the same

pump in greater detail, with the protective casings about the gear ratios removed.

As the service of this motor is below decks it is not necessary that it should be of the fully enclosed waterproof type. It is essential that the motor be protected from dripping water due to condensation or other causes, from accidental wetting down by the spray of a hose or damage to water piping. In this particular installation, the motor used is the type, enclosed, drip-proof, self-ventilated, equipped with ball bearings, 25 horsepower 230 volts 425 to 850 revolutions per minute manufactured by the Electro Dynamic Co., Bayonne, N. J. The self-ventilated feature, that is a fan on the armature shaft, makes possible the use of a smaller frame size for the horsepower output while at the same time the motor fully meets all the requirements of service on shipboard. By using ball bearings enclosed in sealed, grease packed chambers, damage to the motor due to moisture, dirt or escaping oil possible with sleeve

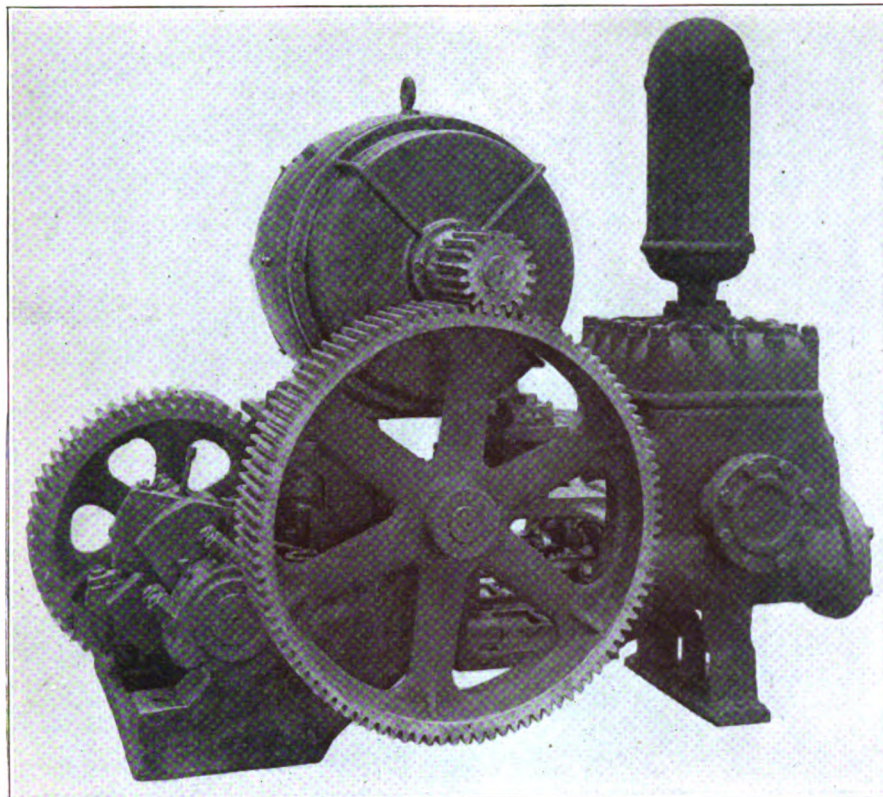


FIG. 2—ELECTRIC DRIVEN PUMP SIMILAR TO THAT SHOWN IN FIG. 1 BUT WITH PROTECTIVE CASINGS ABOUT GEAR RATIOS

bearings when the ship rolls or pitches, is forestalled. It is also claimed that more than 50 per cent of the radial load can be carried as end thrust with ball bearings, which is of considerable importance in insuring the satisfactory operation of the motor at all times, particularly when the ship is rolling or pitching.

Fire and Bilge Pump

The pump used is a 6 x 12 inch horizontal, heavy duty duplex double acting type as developed and manufactured for electric motor drive by the Worthington Pump & Machinery Corp., New York. At a pressure of 100 pounds per square inch and a speed of 53 revolutions per minute, the capacity of this pump is 300 gallons per minute. The pump end is of the manufacturer's standard duplex type, while the power end has the electric motor described above mounted on the frame and within the same floor space. Referring to Fig. 2, the motor communicates its action to the pump by means of a double reduction of cut steel gears and rawhide pinions, the latter in order to reduce noisy operation to a minimum. Both gear ratios are fully enclosed as in Fig. 1, which shows the pump in position on board ship. The crankshaft, of the 2-throw type with cranks set at 90 degrees, of liberal proportions, is forged steel. Connecting rods are of substantial pattern, forged, steel care-

fully fitted at both ends with renewable adjustable boxes. All bearings are exceptionally heavy and are lined with babbitt. Alignment of reciprocating parts is maintained by cylindrically bored guides and adjustable shoes for the crossheads.

The water end is of the regular piston pattern design and both suction and discharge valves are located above the pistons which are at all times submerged. The cylinder bore is fitted with a drawn brass liner. Pistons are made up of a separate iron head and follower mounted on a tapered end of the piston rods and are fitted with fibrous packing rings, all secured in position by nuts. Valves are rubber composition with seats of copper and tin composition. Regular standard fitting is for water service, but the same type of pump is particularly well adapted for handling oil and other similar liquids, with modification of the gaskets, packing and valves. All materials throughout are of the most approved modern practice and well adapted to the service required.

The accompanying illustration Fig. 3 shows a direct-connected, electric motor driven, centrifugal pump on board the motorship SUPHENCO. This pump is used for circulating cooling water through the jackets of the diesel engine cylinders. The electric motor is of the type as the one described above, but of 15 horsepower 230 volts, 1200

revolutions per minute. A centrifugal pump lends itself readily to electric motor drive. The pump shown in Fig. 3 is a 6-inch single stage, double suction, volute pump, with a capacity of 700 gallons per minute at 1200 revolutions per minute and a head of 50 feet. This pump is the regular standard volute type, designed and constructed by the Worthington Pump & Machinery Corp. A general arrangement drawing of the pump with motor is shown in Fig. 4. The casing is split on the horizontal center line and the suction and discharge nozzles are in the lower half. By removing the upper half of the casing, the interior of the pump is fully accessible for inspection or repairs without disturbing pipe connections or pump alignment. The impeller and shaft are bronze. By using the double suction enclosed type impeller, the pump is hydraulically balanced. A flexible coupling of the rubber bushing and pin type is supplied with each unit. Every part of this pump is of the best material and workmanship.

How Costs Compare

Two auxiliary units fairly representative of the entire pumping outfit of a complete diesel ship have been described above. The electric current by means of which these and all other auxiliaries in engine room and on deck are driven, is supplied by diesel engine driven generating sets. Even a cursory examination into fuel costs of operating the above auxiliaries in comparison with these costs using steam shows a overwhelming difference in favor of the electric drive.

For instance, it is well known that reciprocating and turbine driven steam pumps are by the limitations of design, extremely wasteful of steam. A 6 x 12-inch horizontal duplex double acting steam pump will use at least 85 pounds of steam per horsepower per hour, while a steam turbine driven centrifugal pump of the approximate capacity of 700 gallons per minute at 1200 revolutions per minute and at a head of 50 feet, will use about 80 pounds of steam per horsepower per hour. What does this mean in fuel for these two pumps if steam is used? For the reciprocating pump at a rated horsepower of 25, this will mean 2125 pounds of steam per hour. For the centrifugal pump at a rated horsepower of 15, the steam consumption will be 1200 pounds per hour. Assuming a rate of evaporation of 13 pounds of steam per one pound of fuel oil, and to be conservative, one half pound of fuel per horsepower developed by the diesel engine driven generator, and a combined efficiency of the generator and the individ-

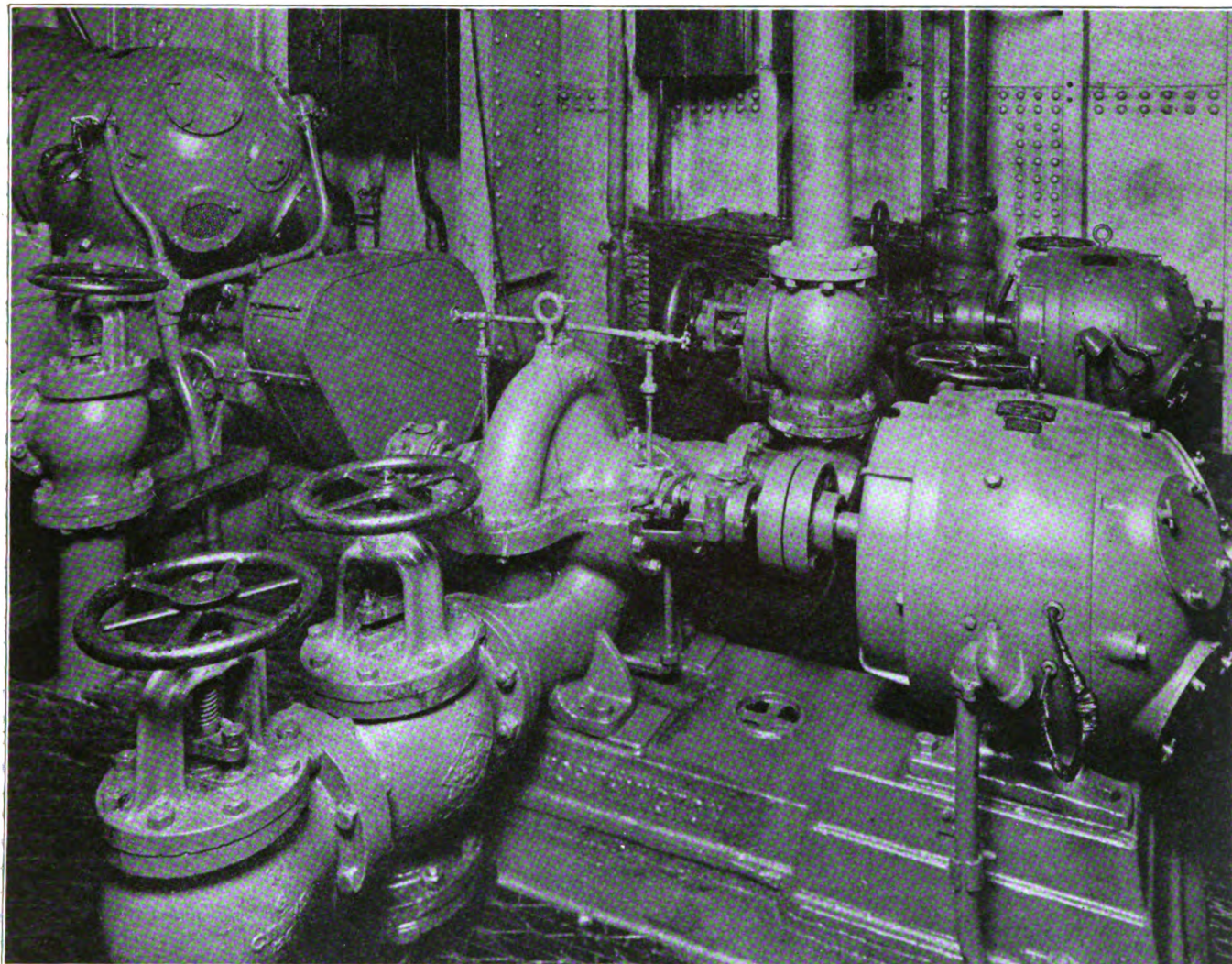


FIG. 3—VIEW OF 6-INCH SINGLE STAGE DOUBLE SUCTION VOLUTE PUMP DIRECT-CONNECTED TO ELECTRIC MOTOR AS INSTALLED ON MOTORSHIP SUPHENCO

ual motor of 85 per cent, it will take 0.6 pounds of fuel per horsepower per hour for either electric driven pump unit.

According to the above figures it will take 163 pounds and 92 pounds, re-

spectively, of fuel oil per hour to operate these pumps with steam, whereas with electric motor drive it will only take 15 pounds and 9 pounds, respectively, of diesel oil per hour. These figures are startling. In other

words, it takes from 10 to 11 times as much fuel to operate these units using the regular steam drive as it does to operate them by electric motor drive, generating the electric current by means of a diesel generating set.

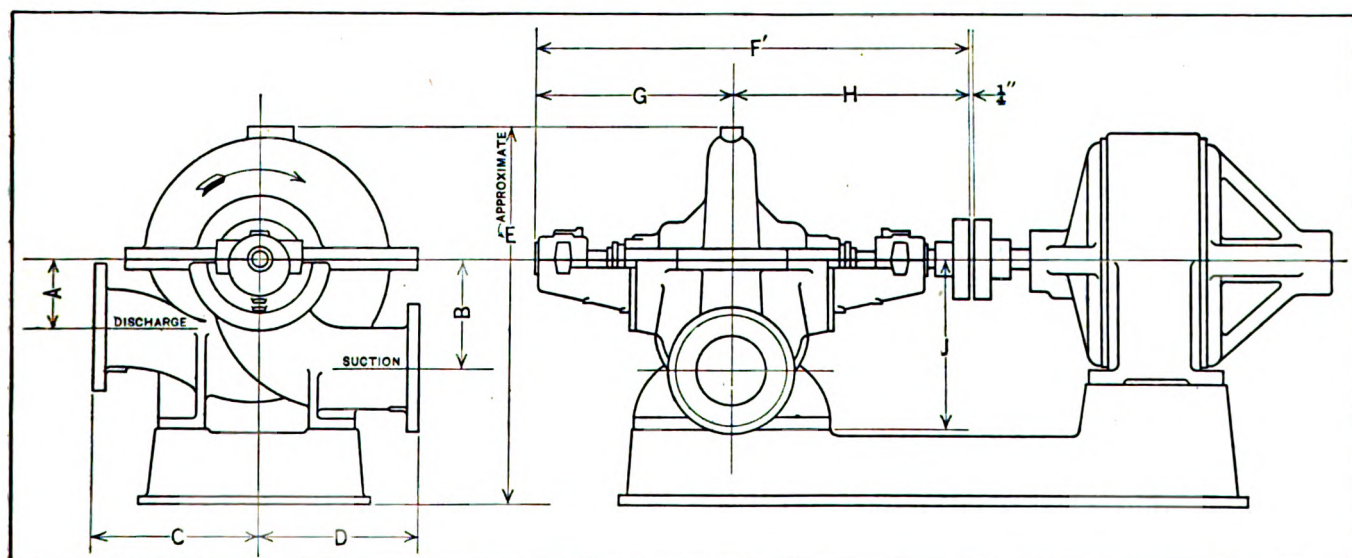


FIG. 4—GENERAL ARRANGEMENT OF DIRECT CONNECTED PUMP SIMILAR TO TYPE SHOWN IN FIG. 3

Allowing a difference in cost of 25 per cent in fuel oil as used under boilers and good diesel oil, the operating fuel costs are from 8 to 8.8 times greater using the steam drive than using the electric drive.

On this basis, it seems perfectly clear that it is poor engineering practice to use steam driven auxiliaries in a vessel with a diesel engine main drive. Cost

of maintenance, repairs and renewals for steam and electric driven auxiliaries, it is claimed by the manufacturer is about the same.

Of course, other factors do enter into the consideration of a choice, however, though not of sufficient weight to alter the conclusions above. Electric driven auxiliaries are from two to three times more expensive; they are some-

what noisier, though the use of rawhide pinions helps a great deal; and flexibility in speed particularly at extremely low speeds is not so great. These difficulties are likely to be overcome in time, to some extent. In the electric drive, of course, the steam leak nuisance is done away with for good, and a certain ease of operation is possible.

Foundry Society Approves Section 28

The following letter was sent to Stuart Daggett of the committee on co-ordination of rail and water facilities, in response to a request for an opinion on Section 28. This section, it will be recalled, calls for the application of the present lower export and import rail rates only when American vessels are used for the sea carriage. Similar requests went to many manufacturers and associations, so that the reply below has general interest:

SECTION 28 of the merchant marine act is a positive action, and as such should prove helpful in bringing some order out of our confused shipping situation. American shipping for years has had the benefit of a great deal of talk and precious little action, so that the use of a positive action like Section 28 should be welcomed by American business men.

Your letter of a few days ago, showing that a committee of government officials, appointed by the President, is actively at work studying the shipping question, and is anxious to find out the business judgment on Section 28, is distinctly encouraging. Even though the first attempted application of this section may have been too abrupt, the net result has been to arouse a large amount of discussion among business men in the value of Section 28, and of American shipping in general. This discussion has obviously been advantageous for American shipping since its major ailments result from a lack of interest on the part of the American business men from whom it must draw its freight.

A representative in England, an American well informed on both English and American business questions, points out in a letter on Section 28 that too frequently American acts in foreign trade are attended by the free publicity and scrutiny to which all of our legislative, and frequently economic, measures are subjected. In England, he points out, such acts are more quietly handled and attract little attention. For instance, he offers quite positive proof that special railroad rates are given to preferred shippers on British railroads, the very

practice which would not be tolerated in this country.

An interesting and instructive study of the possible value of Section 28 is given in the May issue of MARINE REVIEW which I am sending you separately for your study. In the meantime, I can assure you that I believe the manufacturers prefer to test Section 28, many believing it will help to promote our foreign trade, and most of them feeling confident it would strengthen our shipping—the transportation arm which we must use to build up a real foreign business. The section can be applied gradually to certain selected geographical divisions, such as South America, and from its proved results the question of extension to Europe can be more intelligently answered.

Sincerely yours,

(Signed) FOUNDRY EQUIPMENT
MANUFACTURERS ASSOCIATION.

Constructive Novelties on German Ships

By Dr. Alfred Gradewitz

The Flettner rudder, which has been recently installed on several ships of German construction, is a novel device comprising an auxiliary rudder which through remote control from the conning bridge is steered by hand with a trifling expenditure of energy and, under the impact of the water flow behind the ship with a long lever arm acts on the main rudder and adjusts it in any position required. In fact, the auxiliary rudder is to the main rudder what the latter is to the ship itself. This Flettner rudder has recently been combined with an automatic steering device on the gyroscopic system, thus enabling as much as 95 to 97 per cent of the energy otherwise used in steering to be saved, while dispensing with any rudder engine. The services of the helmsman are not needed.

Another interesting novelty cutting down the cost of operation is the counter propeller, a stationary system of guide blades fitted to the main piece of the rudder behind the propeller which by its rotation sets up a whirling water

current. The guide blades, catching this water current, convert its energy into additional thrusts, resulting, it is said, in 10 to 15 per cent surplus efficiency. The ANDALUSIA, equipped with such a counter propeller, recently covered a distance of 8000 miles in 975 hours with a coal consumption of 510 tons, while other ships of the same type but without the counter propeller took an average of 1045 hours, using up 574 tons of coal.

A third novelty is an improvement in the design of the well known Frahm rolling tanks which on the twin-screw steamers ALBERT BALLIN and DEUTSCHLAND are combined with bulging annexes on port and starboard respectively, insuring constant stability with any draft of the vessel and double safety against leakage. An inside hull is inserted within the normal outline of the vessel, enabling the space between the two walls to be subdivided into a number of watertight cells. Some of these cells in the outer hull have slots allowing the sea water to enter the cell. As the vessel in a heavy sea begins rolling, the water itself takes on a pendulating motion, thus checking in the initial stage any rolling oscillation of the hull.

Launch Passenger Liner

The new steamship BIENVILLE building at the Tacoma, Wash., plant of the Todd Drydock & Construction Co., was successfully launched on July 16. When completed, the owner, the Southern Pacific Co., will place the BIENVILLE in service in the Atlantic Steamship Lines fleet (Morgan Line) for the carriage of passengers and freight between New York and New Orleans. Miss Dorothy R. Maxson, sponsor of the ship, is the daughter of Capt. C. P. Maxson who will command the vessel when she goes into service.

The BIENVILLE will be turbine driven and oil burning and is expected to do 16 knots. She is 445 feet over all, 57 feet beam and 37 feet 6 inches deep. On a load draft of 25 feet 6 inches she has a cargo capacity of 480 tons. Her passenger capacity consists of 237 first and 111 third class.

Checks British Shipping Revival

Drop in Coal Export Trade Slows Down Ships—90
Per Cent of Tonnage Active—Shipbuilding Gains

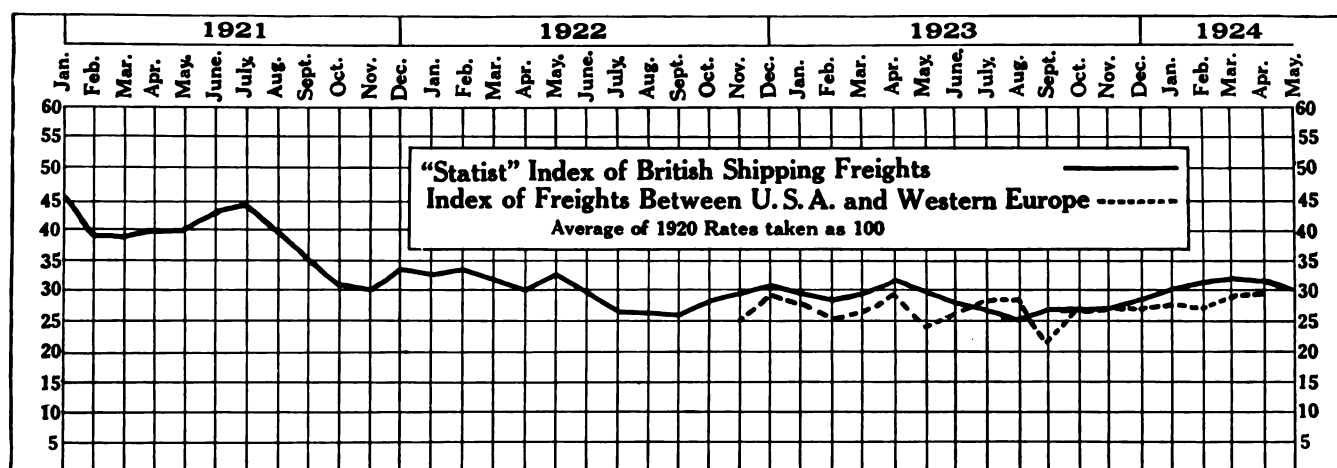
BY H. COLE ESTEP
European Manager, Marine Review

BRITISH shipping enters the second half of the year with the outlook fully as uncertain as at any time in the past six months. Nevertheless, more than 90 per cent of the tonnage under the British flag is in operation and although rates are low, working costs are being met and some profits are being earned. For the five months ended May 31 this year, 11,423 British vessels of 13,642,233 gross tons entered

coal from the United Kingdom during the first five months of 1924 were 26,248,766 tons compared with 33,220,230 tons in 1923. The shrinkage amounts to 21 per cent, but shipments are still considerably ahead of 1922, when in the first five months 22,390,312 tons of coal were exported.

The drop in coal exports has naturally had an effect on freights which have shown very little tendency to improve

ent, therefore, British shipyards are operating at 77½ per cent of their prewar normal rate. This would be satisfactory from the builders' point of view were it not for the increase in capacity which took place during the war. Some of this now useless shipbuilding capacity has been diverted to other purposes and it is evident from the experience of the past year that further readjustments must take place. Those shipbuilding companies



TREND OF BRITISH SHIPPING FREIGHTS FOR THE PAST 41 MONTHS
Monthly Index Number Based on Geometrical Average of 1920 as 100 Compiled by *The Statist*, London, Shows Upward Swing Checked

British ports, together with 8144 foreign vessels of 6,780,099 tons, making a total of entrances of 19,567 vessels of 20,422,332 tons. This compares with 18,448 vessels of 19,088,441 tons in the corresponding period in 1923 and 14,677 vessels of 16,136,301 tons in 1922. The steady growth of British waterborne commerce is indicated by these figures.

In the first five months of this year, 6,230 British ships of 16,498,216 tons were cleared from British ports together with 10,339 foreign vessels of 9,758,860 tons, making an aggregate of clearances of 26,569 vessels of 26,257,076 tons. Last year in the same period 27,412 vessels of 28,562,579 tons cleared from British ports, while in 1922 the figures were 20,863 vessels of 21,909,086 tons. This indicates a falling-off of bulk export trade from the United Kingdom this year as compared with 1923, but shows that traffic is still considerably ahead of 1922.

This falling-off is due almost entirely to the shrinkage of the coal export trade which is always an important factor in British shipping. The total exports of

this year. After creeping up to 32.1 in March, the index number of shipping freights compiled by *The Statist* dropped back to 30.1 in May.

Shipyards Busier

Some revival has appeared in shipbuilding although the construction yards are not yet operating up to more than 60 per cent of capacity. The report of Lloyds' Register of Shipping for the quarter ended June 30 shows that the tonnage under construction in Great Britain and Ireland at midyear was 1,516,746 tons. This shows an increase of about 43,000 tons over the tonnage under construction at the end of March. The increase compared with June 30, 1923 is 179,000 tons.

The figure given above includes 52,000 tons on which work is suspended. Deducting this, the tonnage actually under construction at the end of June this year amounted to 1,465,000 tons, which is the highest reached since the end of March 1922. The average under construction during 1913 was 1,890,000 tons. At pres-

ent, therefore, British shipyards are operating at 77½ per cent of their prewar normal rate. This would be satisfactory from the builders' point of view were it not for the increase in capacity which took place during the war. Some of this now useless shipbuilding capacity has been diverted to other purposes and it is evident from the experience of the past year that further readjustments must take place. Those shipbuilding companies

which were not unduly extended during the war are now in a fairly comfortable position. The tonnage of motorships building at the end of June in the United Kingdom was 355,590 tons, equal to nearly 31 per cent of the steam tonnage under construction. British ship prices are showing a little firmness but competition between builders is still so severe that the advances are confined to shillings per ton. The same is true of second hand steamers. Steamers 20 years old were recently sold at London auctions down to £3 17s 6d per ton, equivalent to \$16.75. These were vessels carrying about 8000 tons deadweight. One of the most interesting orders recently placed with British yards is that for two tanks steamers which will be built by Palmers Shipbuilding & Iron Co., at Jarrow, for the Gulf Refining Co., Pittsburgh. These are the first vessels which the Gulf company has ordered in Great Britain.

Another sidelight on the condition of British shipbuilding is thrown by the report of John Brown & Co., Clydebank,

for 1923, which discloses a net profit of £212,240 (\$925,000), enabling a dividend on the common stock of 5 per cent to be paid. These profits were about the same as for the year before.

There is considerable discussion in British shipping circles at present regarding double taxation. The United States government has agreed to remit taxes on British ship earnings in America if the British government will reciprocate. The British government has expressed its willingness to offer reciprocal exemption to American ships as regards their earnings in Great Britain, but as a matter of fact the British treasury has taken no concrete steps to put this relief into effect. In response to a question in the house of commons not long ago, Mr. Graham, financial secretary of the treasury, said that the arrangement for relief of double taxation on shipping between Great Britain and the United States was not likely to come into force at an early date. This is due almost entirely to official red tape and business men in the United Kingdom regard the provisions of the law passed by congress on this subject as representing an offer which should be put into effect immediately.

The only other subject of general international interest which is engaging the attention of British shipowners at the present time is the question of cargo handling facilities at British ports. This has been agitated for some time and at last steps are being taken to improve the facilities of certain ports, notably on the Bristol channel. Meanwhile, however, dock laborers' wages have been increased and as a result the port of London authority has drastically increased its charges.

Trades in Far Arctic

Minus liquor, tobacco and radio sets, the little schooner C. S. HOLMES left Seattle on her annual pilgrimage to the Arctic in command of her owner, Capt. John Backland, one of the most picturesque mariners ever associated with the northern seas. Captain Backland is widely known as the missionary-trader and while doing business with the natives of the Arctic he also spreads the gospel. He will not permit the use of tobacco on his vessel and refuses to carry that commodity to the natives. However, the HOLMES has 1000 tons of practically everything else that is required in any modern community. She has no radio and no auxiliary engines. When Captain Backland enters or leaves port, he lowers a small gas boat into the water and this acts as a tow for the larger vessel. Captain Backland is emphatically condemnatory of those traders who debauch the natives with whiskey and tobacco.

What the British Are Doing

AT THE annual meeting of Guest, Keen & Nettlefolds, the chairman, Edward Steer, mentioned as one of the disadvantages of the steel trade the fact that British manufacturers find it cheaper to send their goods to Antwerp to be transhipped there to the port of destination, than to send them from British ports. This is a grievance which is equally regretted by the shipping industry, as the shippers would benefit in the long run if they could compete on equal terms. But the difficulties in the way are formidable, the working expenses of some of the foreign companies are so much lower that any attempt to assimilate British rates would involve loss. Nevertheless shippers have under consideration the question whether these rates should not be quoted, in the hope that sooner or later the foreign trade may be captured. The exchanges play a large part in these disparities, and some little relief is hoped for in this direction.

MOST of the bigger yards in the various shipbuilding districts are fairly provided with work, but there are still a good many vacant berths. The outstanding feature of the June returns was that the amount of tonnage launched in June was larger than that of any month of the year and almost equal to that of the preceding two months. It is estimated that in the last 12 months shipbuilding has exceeded shipbreaking and other deductions by about 500,000 tons compared with 750,000 tons in the last reported figures, and in the countries of low wages, such as Germany no tonnage is laid up. The question of shipbuilding is largely one of freights and every rise in freights brings a number of laid up ships into the market to compete for business. The time may arrive when the shipowners decide that it will pay them better to build up-to-date ships especially of the oil-propelled class, in view of the much more economical working possibilities through reduced labor costs and larger carrying capacity.

A QUESTION of some importance which may become pressing in the near future is the effect involved through the reduction of the naval building program upon the national dockyards such as Devonport and Portsmouth. There are now very short of work, and as they have fine natural harbors, they ought to be used for building mercantile ships. Another alternative is that the whole of the national requirements in the matter

of capital ships, cruisers, destroyers, submarines and auxiliaries shall be built in national yards. "National work for national yards" is likely to be the slogan, especially with a labor government in power. It will be remembered that the recent order for cruisers was placed partly in private yards, and it has been usual to throw the contracts open for competition.

THE Fairfield Shipbuilding & Engineering Co. Govan on the Clyde in June launched the AORANGI, a vessel built for the Union Steamship Co. of New Zealand. This is said to be the largest, most powerful and fastest oceangoing vessel yet built for propulsion by internal combustion engines. The length of the vessel is 600 feet with a width in beam of 72 feet, a depth of 46 feet 6 inches, and about 23,000 tons displacement. The furnishings are of the most complete and luxurious description comprising cabins de luxe with bathrooms attached, music rooms, a nursery and a gymnasium. The bunkers will carry sufficient fuel oil for the whole of the round voyage from Vancouver to Sydney, a total distance of 15,000 miles or equal to five trips across the Atlantic. The engines are of 13,000 indicated horsepower, driving quadruple screws and designed to give a speed of about 18 knots. Several other vessels of the same type are to be built.

A STEEL self-docking floating dock of 3000 tons lifting power built by Swan Hunter & Wigham Richardson Ltd., at their Wallsend shipyard on the Tyne for the government of the colony and protectorate of Nigeria has been successfully launched. The dock is 270 feet long over the pontoons, with two end platforms each 20 feet long making up a total length of 310 feet. The machinery consists of two installations capable of lifting a vessel of 3000 tons in about 2½ hours.

DIFFICULTIES connected with shipbuilding recently have related largely to the impossibility of producing vessels at competitive prices. The cost of production is considerably increased by the recent award of the industrial court adding 7 shillings per week to the existing scale of wages. Sir Alexander Kennedy recently pointed out this should give a hint to shipowners that ships are not likely to cost buyers less than at the present time, and this fact he said, should be recognized by all having orders to place. Another circumstance which is expected to assist shipbuilding recovery is the superior running and earning power of the latest type of vessel, favoring substitution of these for existing ships.

Form British Company To Meet Foreign Growth

Owing to the great increase in its business in Europe and the constant development of its editorial services, the Penton Publishing Co., publisher of *MARINE REVIEW*, *Iron Trade Review*, *Daily Metal Trade*, *The Foundry*, *Abrasive Industry*, *Power Boating*, etc., has incorporated a British company which will have charge of its European affairs hereafter. This company is known as the Penton Publishing Co., Ltd., and its registered offices are at Caxton House, Westminster, London, S. W. 1, with branch offices at

Prince's Chambers, Corporation street, Birmingham, England; 23 Rue de la Bienfaisance, Paris; and 218 Friedrichstrasse, Berlin.

The growth of the Penton Publishing Co.'s foreign business is indicated by the British Empire Exhibition advertising insert which was published recently in *Iron Trade Review*, and by the large increase in the book business of the company.

The organization of the limited company in England will enable further developments to take place. Meanwhile the foreign editorial services of the Penton publications are being constantly

strengthened. This is indicated by the publication of world prices of iron and steel in *Iron Trade Review* for the first time in any business publication, and in many other directions, such as the publication of the quarterly survey of European business conditions which enables the American business man to determine the situation abroad at a glance, and the publication of the real summaries of the foreign shipping situation at regular intervals.

The directors of the Penton Publishing Co., Ltd., of London are John A. Penton, A. O. Backert, C. J. Stark, J. D. Pease and H. Cole Estep.

Ocean Freight Rates

Per 100 Pounds Unless Otherwise Stated

Quotations Corrected to July 21, 1924, on Future Loadings

NOTE: FREIGHT RATES STEADY WITH WEAKNESS ON SOME COMMODITIES

New York to	Grain	Provisions	Cotton (H. D.)	Flour	General cargo	††Finished steel	REMARKS Freight Offered	From North Pacific Ports to	Lumber Per m. ft.
Liverpool....	1s 9d†	\$0.50	\$0.30	\$0.17	cu. ft. \$0.40 100 lbs. \$0.75	\$7.00T	Slow	San Francisco.....	\$5.50 to 6.00
London.....	1s 6d†	0.50	0.30	0.17	0.40 0.75	7.00T	Slow	South California.....	6.00 to 6.50
Christiania....	\$0.12	0.45	0.40	0.26	0.42½ 0.85	8.00T	Quiet	Hawaiian Islands.....	10.00 to 10.50
Copenhagen....	0.12	0.45	0.40	0.26	0.42½ 0.85	8.00T	Quiet	New Zealand.....	15.00 to 16.00
Hamburg.....	0.07	0.35	0.32½	0.16	0.37½ 0.75	8.00T	Improved	Sydney.....	12.00 to 13.50
Bremen.....	0.07	0.35	0.32½	0.18	0.37½ 0.75	8.00T	Slow	Melbourne-Adelaide....	12.50 to 13.50
Rotterdam and Amsterdam.	0.08	0.32½	0.30	0.18	0.35 0.70	7.50T	Quiet	Oriental Ports.....	8.50 to 10.50
Antwerp.....	0.08	0.30	0.30	0.18	0.35 0.70	7.00T	Slow	Oriental Ports (logs)....	13.00 to 15.00
Havre.....	0.20	0.50	0.30	0.27½	0.40 0.75	8.00T	Slow	Peru-Chile.....	13.00 to 15.00
Bordeaux.....	0.20	0.50	0.30	0.27½	0.40 0.75	8.00T	Slow	South Africa.....	17.50 to 19.00
Barcelona.....	0.20 to 0.25	12.00T	0.30	10.00T	—12.00T—	10.00T	Fair	Cuba.....	12.50 to 13.50
Lisbon.....	0.20	0.65	0.40	7.00T	—20.00T—	7.00T	Fair to Good	United Kingdom.....	80s to 90s
Marseilles....	0.14	0.55	0.50	5.60T	—20.00T—	5.00T	Very Slow	United Kingdom (ties)...	70s to 80s
Genoa.....	0.15	0.50	0.40	0.27	0.40 0.80	6.00T	Good	Baltimore-Boston range.	\$12.50 to 15.00
Naples.....	0.15	0.50	0.40	3.27	0.40 0.80	6.00T	Fair	Baltimore-Boston range (ties).....	Not quoted
Constantinople	0.23	17.00T	0.75	0.32½	—20.00T—	9.00T	Quiet	Buenos Aires.....	14.00
Alexandria....	0.25	17.00T	0.75	0.30	—20.00T—	9.00T	Quiet	Flour and Wheat	
Algiers.....	0.20	0.75	0.75	0.40	—20.00T—	7.00T	Very Slow	Oriental Ports (net ton). \$	4.50 to 5.50
Dakar.....	.....	14.50T	.....	12.00T	—20.00T—	10.00T	Good	U. K. and Continent (gross ton).....	32s 6d to 35s
Capetown.....	12.00T	12.00T	.....	10.00T	—12.00T—	9.00T	Good	Mediterranean.....	37s 6d to 40s
Buenos Aires..	.....	18.00 to 20.00T	.....	.....	18.00 to 20.00T†	8.00 to 8.80T	Fair		
Rio de Janeiro	.....	19.00 to 21.00T	.....	7.00 to 7.70T	19.00 to 21.00T†	6.00 to 6.60T†	Not Good		
Pernambuco....	.....	22.00T	.....	9.00T	—22.00T—†	8.60T†	Fair		
Havana.....	0.22½ to 0.27½*	0.42½*	.....	0.22½*	0.54* 1.08*	0.20*	Fair		
Vera Cruz....	0.25	0.40	0.45	0.25	0.52½ 1.05	0.30 to 0.35	Fair		
Valparaiso....	.....	1.07	.....	0.70	0.45 0.80	10.00T	Good		
San Francisco..	.....	0.40 to 0.70	.....	0.50 to 1.10	 2.50	0.55 to 1.00	Good		
Sydney.....	.....	18.00T	2.50	18.00T	18.00-24.00T	9.00-12.00T	Good		
Calcutta.....	.....	16.00T	0.60	12.00T	—16.00T—	10.00T	Fair		

T—Ton. †Per quarter of 480 lbs. ††Landed. †††Heavy products limited in length. *Extra charge for wharfage.

Principal Rates To and From United Kingdom

Grain, River Plate to United Kingdom.....	32	d	Pig iron, United Kingdom to New York	14	0
Coal, South Wales to Near East.....	11	6	or Philadelphia.....	6	9
Coal, United Kingdom to Buenos Aires....	13	0	Iron ore, Bilbao to Middlesbrough....	7	0
Manganese Ore, Poti to Philadelphia.....	\$4.00		Iron ore, North Africa to Philadelphia		

Bunker Prices

At New York

	Coal alongside per ton	Fuel oil alongside per barrel	Diesel oil alongside per gallon
April 11, 1923	\$6.75@7.50	\$1.76½	\$1.10@5.35c
July 11.....	5.50@7.00	1.76½	4.40@5.50c
Oct. 11.....	5.25@6.85	1.51½	4.00@4.50c
Jan. 9, 1924...	5.25@6.50	1.41½	4.63@5.42c
April 8.....	4.50@6.50	1.66½	5.51c
June 19.....	4.50@6.25	1.81½	5.51@5.65c
July 21.....	4.50@6.25	1.81½	5.16@5.65c

At Philadelphia

	Coal trim. in bunk. per ton	Fuel oil alongside per barrel	Diesel oil alongside per gallon
April 10, 1923	\$6.60@7.10	\$1.875	5.10 cents
July 9.....	5.85@6.85	1.62 @1.73	4.35@4.60c
Oct. 11.....	5.60@6.10	1.36½@1.51	4.12@4.36c
Jan. 9, 1924...	5.50@6.30	1.415	3.86c
April 8.....	4.85@5.85	1.955	5.41@5.65c
June 19.....	4.85@5.85	1.848	4.90@5.38c
July 21.....	4.85@6.00	1.945	5.40

Other Ports

Boston coal, per ton	\$6.66
Boston, oil, f. a. s., per barrel	\$1.34
Hampton Roads, coal, per ton f.o.b.,	4.20@5.00
Cardiff, coal, per ton	17s 6d
London, coal, per ton	25s 6d
Antwerp, coal, per ton	24s 6d

Photographs from Far and Near



A cool reminder for hot summer days. The three surrounding photographs were taken last winter on the Baltic sea which had an unusually thick coating of ice. The German battleship Braunschweig was called upon to break through and rescue imprisoned ships, 40 in all



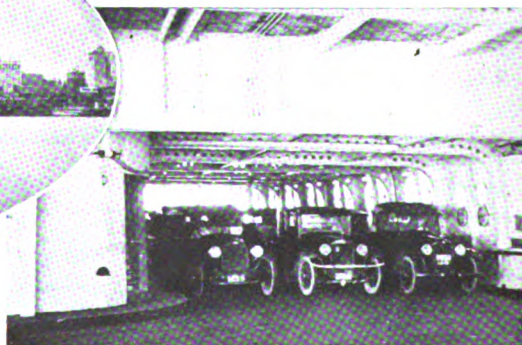
Italian fishing boats at Boston, with the bark Nereus in background. She has sailed for Europe with college students aboard



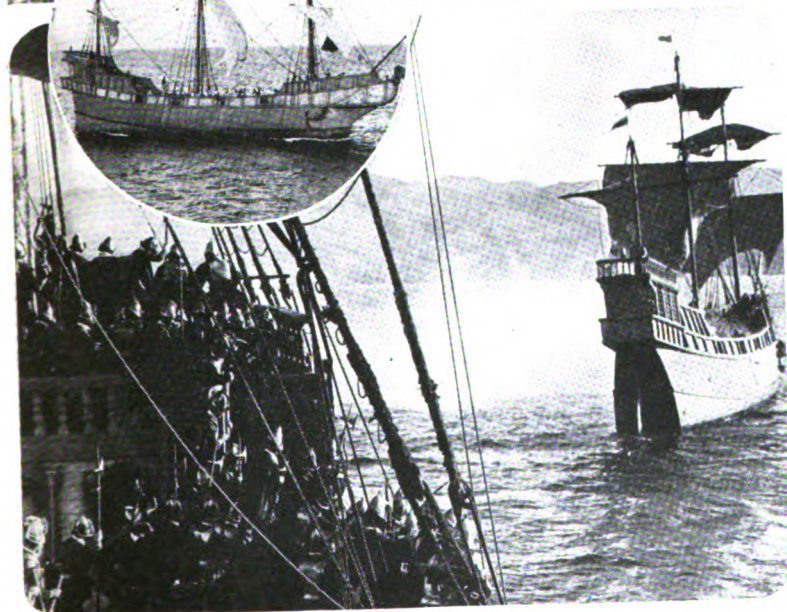
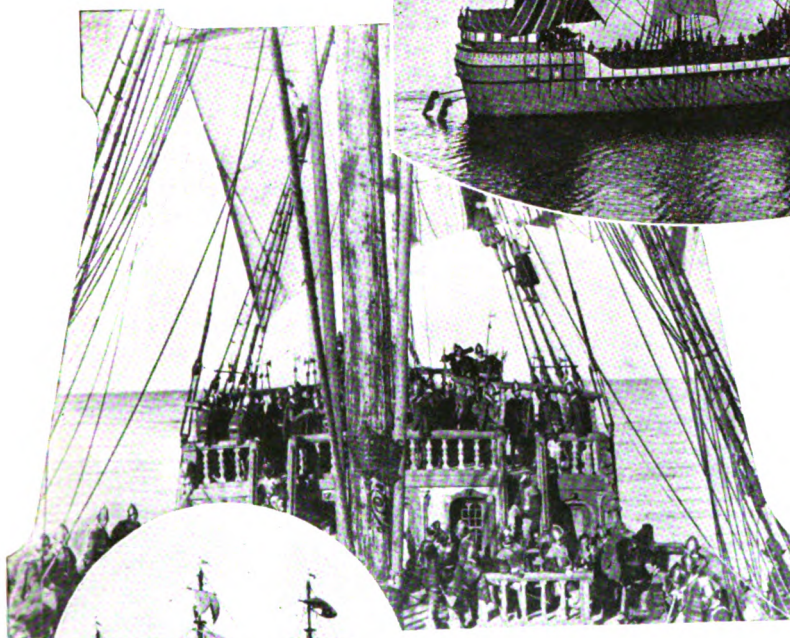
America's fast scout cruisers are covering the world on their shaking-down trips. View shows U. S. S. Concord at St. Helena Island



Auto ferry LaSalle, built at Toledo, O., shipyard for Detroit river service.



Latest Marine News in Pictures



A bit of the 16th century to entertain the 20th century movie fan. Four old type vessels were built at a cost of \$275,000 to permit realistic filming of the Sea Hawk, Sabatini's famous story. The boats required 93 days to build, ranged in size from 102 to 192 feet long and carried from 100 to 450 sailors, warriors and galley slaves. Upper left, English frigate; upper right, Spanish galleon; above, Moorish gallease; left, Spanish galleon; inset, English tramp; below, left, battle Spanish galleon (left) English tramp (right); below at right, pirate ship



Salvaging Hulls of Battleships

About 10,000 Tons of Material Heretofore Lost in Scrapping Each Ship
Now Is Reclaimed by Method of Cutting Up Hulls At Navy Yards

BY CHARLES A. BARNES

FOR 30 years it has been the custom of the United States navy to sell for scrap as many of its old battleships as were not required for target practice. The method pursued by the buyers was to tow the ships to an isolated spot and recover all of the material that could be gotten off of the boat down to the water line. They then either abandoned the hulls or towed them out to deep water and sank them.

Following the limitation of armaments conference at Washington, the problems involved in the scrapping of war vessels immediately became more important. It became particularly desirable to evolve an easy and economical way of reclaiming the large amount of material in the hulls which formerly had been wasted. It may be estimated conservatively that this material averages 10,000 tons per hull. During the past two years at least two companies in the East have gone to great expense in installing equipment for handling such ships alongside dock or river-bank. One of these companies has been operating for nearly three years and the

Salvage Problem Solved

AT THE request of MARINE REVIEW, Charles A. Barnes, treasurer of the Steel Scrap Co., and vice president of the Perry, Buxton, Doane Co., Philadelphia, has written the accompanying review of the developments in the ship scrapping program which devolved on the United States navy as a result of the agreement at the limitation of armaments conference at Washington. As is clearly indicated by Mr. Barnes, the navy yards, and particularly that at Philadelphia, are ideally equipped to salvage the scrap in vessels. Mr. Barnes tells how the salvaging of the hulls is accomplished without difficulty at the Philadelphia yard.

other for one year, but neither has gotten to the point of disposing of the hull after cutting down to the water line. These companies either have not

bid at all, or have made extremely low bids on the ships that have been offered for sale during the past six months.

Captain E. W. Bonaffon, senior member of the naval board who had gained a reputation for the able manner in which he had been disposing of the navy's surplus material, was given full charge of the sale of the ships to be scrapped as a result of the Washington conference. On Oct. 25, 1923, he offered for sale the battleships SOUTH DAKOTA and INDIANA under construction at the Brooklyn navy yard, NORTH CAROLINA at the Norfolk navy yard, MONTANA at Mare Island and the battle cruisers UNITED STATES and CONSTITUTION at the Philadelphia navy yard. A catalog of these vessels, together with descriptions and weights and the different materials in them, was sent to all possible bidders. These vessels were offered for sale in three ways: (1) "As is" lump sum, the buyers to do the work; (2) per ton, cut to shipping size, f.o.b. cars; and (3) per ton, cut to charging box size, f.o.b. cars.

After the catalog was printed, the



FIG. 1—DECK OF BATTLESHIP ALABAMA AFTER BEING USED BY UNITED STATES ARMY AS TARGET FOR AIRPLANES OVER CHESAPEAKE BAY. SOLD TO A WRECKING COMPANY "AS IS"

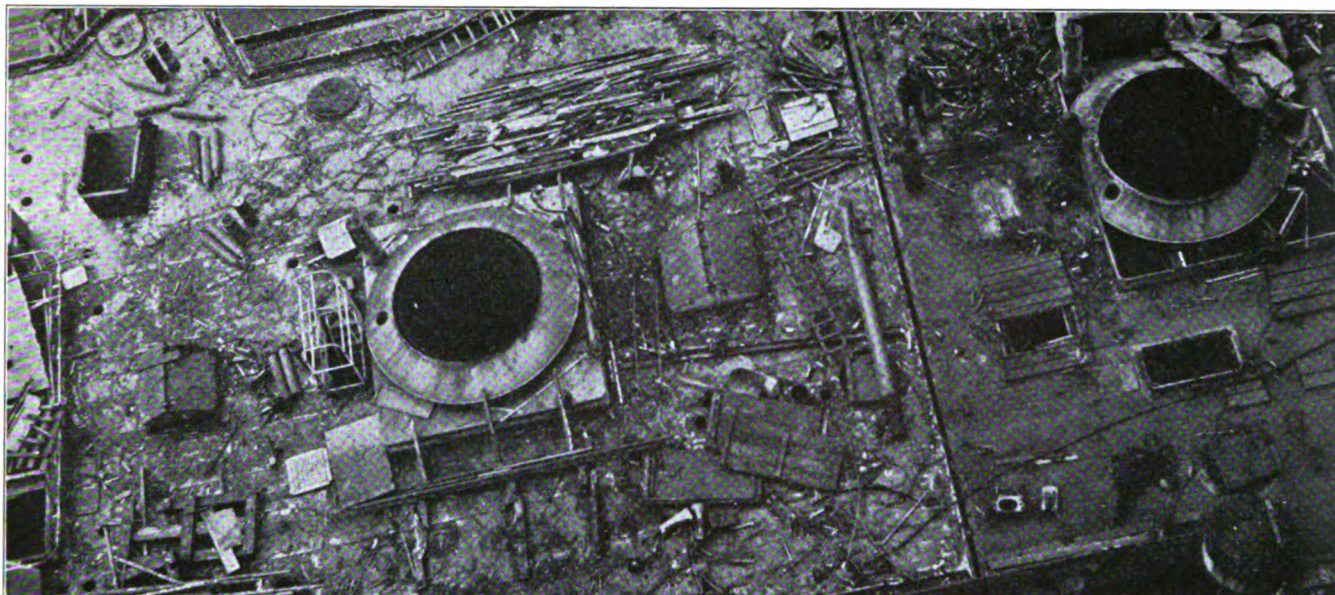


FIG. 2—DECK OF U. S. S. MICHIGAN AT PHILADELPHIA NAVY YARD THREE WEEKS AFTER WORK OF SCRAPPING STARTED

question of scrapping these ships in the navy yards was studied thoroughly, and it was decided that the cost of the work in the navy yards would be too high. It was decided, therefore, to consider only bids on a lump sum "as is" basis. When the bids were opened, it was found that practically every bidder with the exception of the Steel Scrap Co. had bid on the "as is" lump sum basis. But the bid of the Steel Scrap Co. was so much higher than the other bids that Captain Bonaffon called a conference of the different interests involved, including the contractors and the acetylene and torch men, and he sought to get a bid for cutting up the

vessels on which the navy could net more money by accepting the bid of the Steel Scrap Co. than by selling the vessels for a lump sum.

At this meeting the Steel Scrap Co. offered to cut the two boats in Brooklyn to charging box size for \$9 a ton and to cut the two boats at Philadelphia to shipping size for \$3.50 a ton, and it contended that because of the scope and suitability of its equipment, the navy itself could scrap these vessels more cheaply than anybody else. Captain Bonaffon held several other conferences and conferred with the construction officers of the Brooklyn and Philadelphia navy yards on the matter.

These officers, after thorough consideration, decided to contract with the navy to do the work at the prices that had been named by the Steel Scrap Co. The only exception was in the case of the MONTANA, at Mare Island, on which the only bid was a lump sum.

The results already have proved that the original estimate was conservative. The Philadelphia navy yard already has scrapped one boat, the CONSTITUTION, at a cost of less than \$3 per gross ton, while at Brooklyn about one-half of the tonnage in that yard had been scrapped at a cost under the original estimate.

On Nov. 1, 1923, the following ships afloat were offered for sale on the

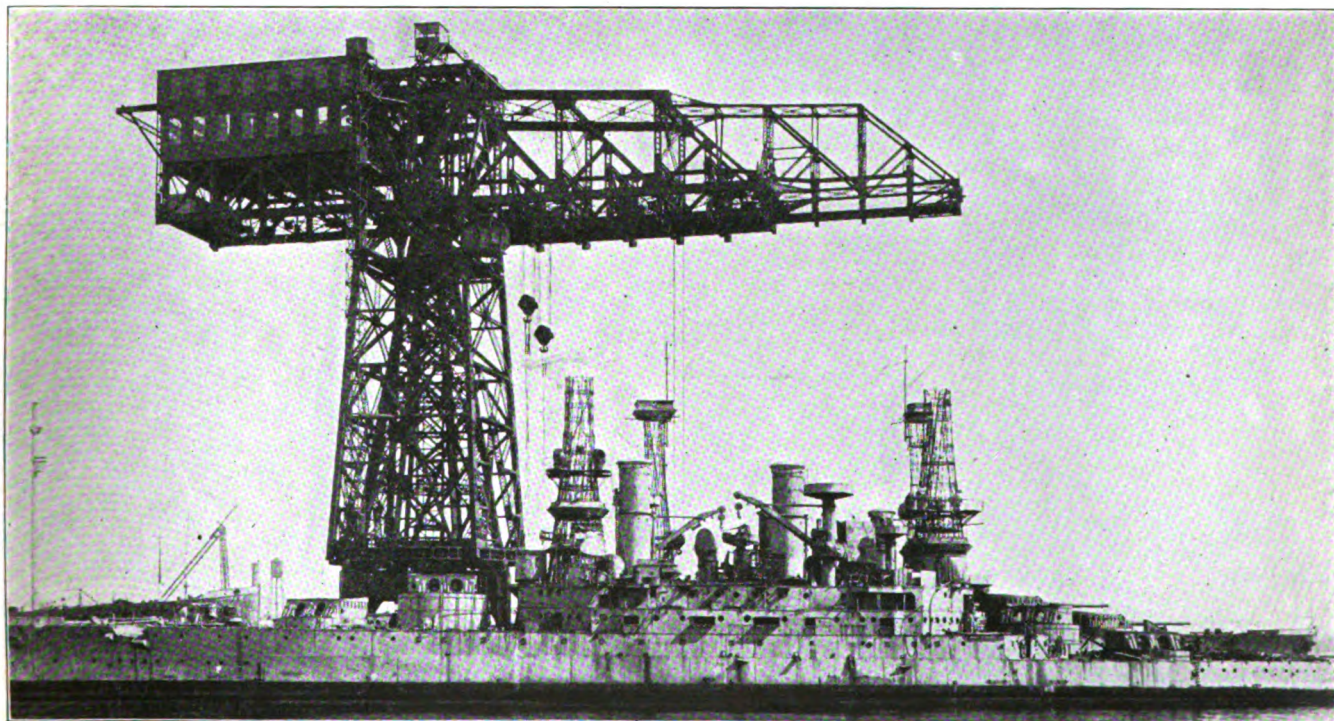


FIG. 3—U. S. S. MICHIGAN AT PHILADELPHIA NAVY YARD DISMANTLED AND READY FOR CUTTING UP. SEE FIG. 2

lump "as is" basis: NEW HAMPSHIRE and LOUISIANA at Philadelphia, GEORGIA and RHODE ISLAND at Mare Island and the CONNECTICUT at Puget sound. The Steel Scrap Co. refused to bid on these ships, its experience indicating that the companies handling boats in this manner on the eastern coast had lost money on account of lacking equipment for handling all of the material, particularly the large amount of steel in the hull. The company again strongly recommended that the navy cut the boats in the Philadelphia navy yard, in which event it offered to bid on the material f.o.b. cars, cut to shipping size. These boats, however, were sold on the "as is" lump sum basis.

On Nov. 8, 1923, Captain Bonaffon sent out a catalog offering for sale the battleship IOWA and the battle cruisers CONSTELLATION and RANGER, then in the process of construction at the plant of the Newport News Shipbuilding & Drydock Co., Newport News, Va., and also the battleship MASSACHUSETTS, then under construction at the Fore River plant of the Bethlehem Shipbuilding Corp., Quincy, Mass. Inasmuch as these vessels were located in private yards, the navy took only "as is" lump sum bids on the vessels at Newport News, and on a gross ton basis, in shipping sizes, f.o.b. cars, at Quincy.

On Nov. 30, 1923, the following battleships afloat were offered on an "as

is" lump sum basis: MICHIGAN, MINNESOTA and KANSAS at Philadelphia; VERMONT and NEBRASKA at Mare Island and the DELAWARE at Boston. The highest lump sum bids on these boats in the east were as follows: MICHIGAN, \$40,000; MINNESOTA, \$37,760; KANSAS, \$45,000, and DELAWARE, \$36,666. The Steel Scrap Co. again refused to bid in this manner and again suggested the boats be cut up by the navy. The bids were thrown out and the navy decided to cut the boats itself and sell the material, cut to shipping size, f.o.b. cars at the Philadelphia navy yard. The sale was held Jan. 23, 1924, and brought the following prices for the scrap in the MICHIGAN, MINNESOTA and KANSAS:

50,000,000 pounds of iron and steel scrap at \$14.05 per gross ton.....	\$313,616.07
22,000,000 pounds of armor plate scrap at \$14.10 per gross ton..	138,482.14
1,400,000 pounds of metal scrap at 8.97½ cents per pound.....	126,000.00
Total	\$578,098.21

On Feb. 5, 1924, the navy sold at the Boston navy yard the battleship DELAWARE to be cut in the Philadelphia navy yard. This scrap brought the following prices, f.o.b. cars, Philadelphia:

10,814 gross tons of iron and steel scrap at \$12.42½.....	\$134,403.95
4,894 gross tons of armor plate scrap at \$11.50	56,281.00
850 gross tons of forgings at \$11.50	9,775.00
275 gross tons of metal at 7½ cents per pound.....	4,125
Total	\$204,584.95

The boats are being scrapped at the

Philadelphia navy yard, on both sides of Pier 8, which is equipped with a 350-ton crane as well as a smaller crane. The material is cut to shipping size by the use of oxy-acetylene torches. The pieces then are lifted off by means of the cranes and loaded on to cars. After all of the heavy pieces have been lifted off, the boats are to be placed in dry dock where the remaining tonnage will be cut with torches. Thus, every pound of material in the vessels will be converted into marketable scrap ready for shipment.

The navy's estimate for cutting these afloat ships is \$8 per gross ton, but careful observation of the work indicates that, unless saddled with a tremendous overhead, the work of salvaging these vessels will be done for \$6 a gross ton. Even at the \$8 figures, there will be a tremendous saving to the government. Captain Bonaffon estimates that the saving to the government by cutting the vessels in the navy yard will be at least \$400,000 as compared with the prices, that would have been realized on an "as is" basis by sale to outside wreckers.

It is the writer's belief that the United States navy never again will sell a boat to a private company on an "as is" basis for the reason that, with its equipment, it can do the work much more cheaply and expeditiously than anybody else.

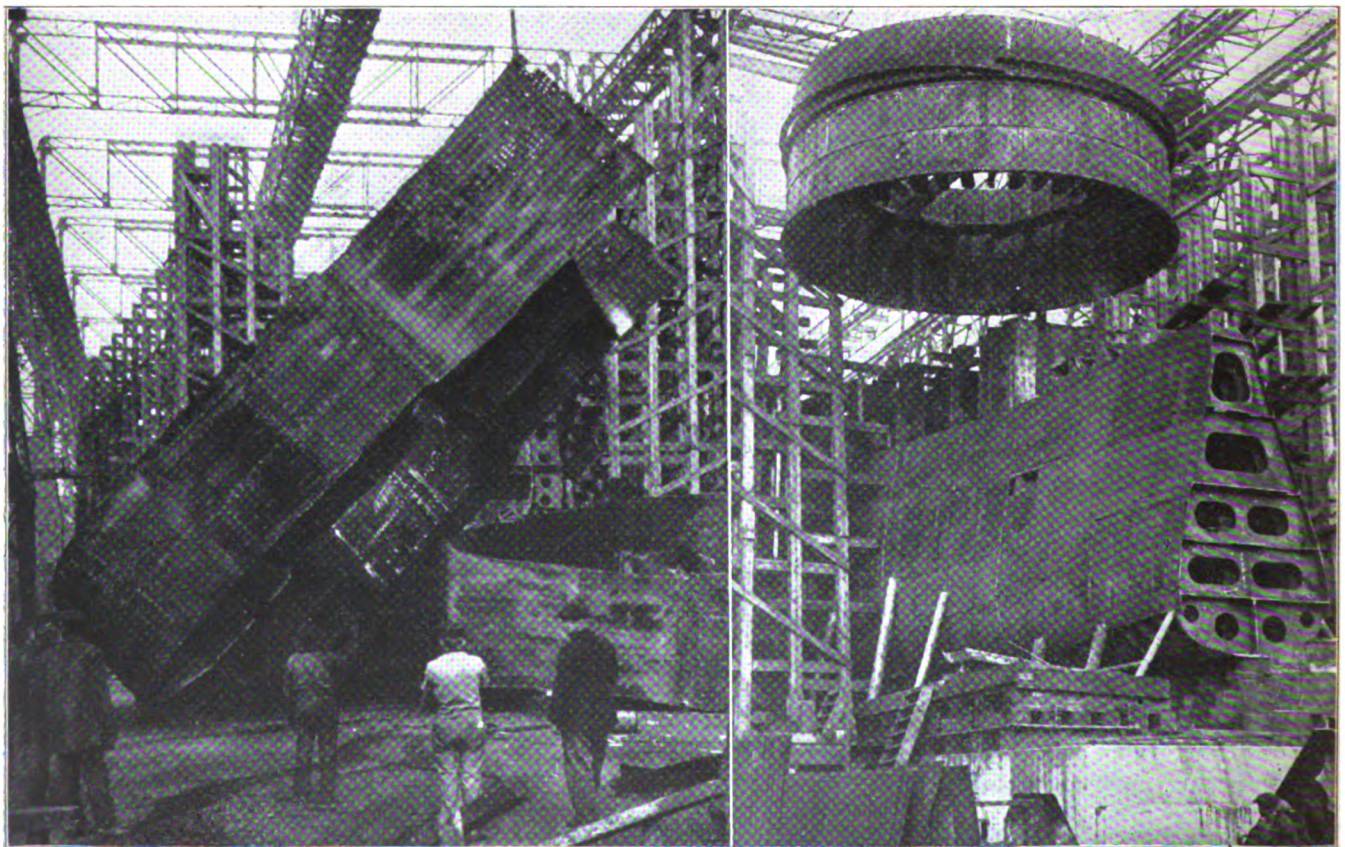


FIG. 4—SECTIONS WEIGHING ABOUT 40 TONS ARE CUT. FIG. 5—REMOVING A TURRET FROM U. S. S. INDIANA AT BROOKLYN NAVY YARD

Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1924	465	1,882,471	495	2,014,598
May	466	1,811,769	520	2,046,833
April	469	1,814,848	504	1,958,579
March	418	1,517,503	459	1,694,905
February	378	1,467,340	445	1,738,675
January	370	1,513,056	434	1,749,172
December, 1923	383	1,507,914	445	1,658,423
November	418	1,768,503	461	1,976,338
October	462	1,868,446	489	1,993,758
September	428	1,818,981	477	1,978,023
August	468	1,855,045	520	2,039,732
July	462	1,799,886	490	1,962,302
June	466	1,799,908	518	2,075,654

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1924	94	214,439	75	179,939
May	99	219,934	76	216,237
April	82	195,774	82	232,501
March	80	203,260	66	190,240
February	86	224,309	64	186,373
January	60	151,915	53	155,550
December, 1923	78	227,055	64	190,644
November	78	198,122	54	135,077
October	93	241,457	64	178,279
September	92	236,293	74	182,700
August	97	251,295	73	180,771
July	109	269,158	77	177,700
June	102	257,507	69	191,633

Boston

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1924	147	283,982	110	200,026
May	122	260,300	100	219,216
April	100	282,324	63	165,557
March	89	262,438	50	132,863
February	99	307,627	44	133,504
January	84	250,335	47	116,832
December, 1923	102	285,125	48	130,115
November	91	305,230	60	166,404
October	118	354,296	59	156,940
September	117	307,719	79	185,726
August	126	302,391	86	178,706
July	146	337,033	85	174,106
June	176	319,135	128	176,853

Portland, Me.

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1924	20	34,631	19	31,911
May	19	33,970	21	40,832
April	17	75,406	21	91,045
March	23	79,648	22	72,517
February	20	67,476	22	69,594
January	22	56,749	23	59,235
December, 1923	29	104,724	26	100,583
November	25	80,910	24	74,849
October	19	39,456	15	32,471
September	9	22,724	10	25,582
August	11	24,155	8	18,838
July	8	18,148	9	17,770
June	7	22,613	8	25,941

Providence

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1924	5	21,873	4	10,456
May	10	23,795	4	17,931
April	9	30,592	6	18,959
March	7	33,895	6	23,517
February	10	39,388	8	35,236
January	8	33,215	7	28,927
December, 1923	12	43,345	7	23,294
November	5	23,038	6	15,700
October	8	30,248	9	24,821
September	9	31,514	12	41,646
August	9	34,323	9	27,664
July	10	25,155	7	29,316
June	7	25,466	5	17,238

Baltimore

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1924	117	339,212	104	298,765
May	122	369,797	126	378,501
April	112	329,900	106	310,159
March	98	297,869	110	331,665
February	98	310,158	107	335,108
January	85	270,169	99	315,804
December, 1923	117	365,142	110	354,229
November	90	280,617	91	279,278
October	96	285,871	95	297,566
September	94	292,315	99	297,965
August	100	303,073	92	262,306
July	130	390,465	137	395,206
June	140	407,872	135	406,138

Norfolk and Newport News

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1924	36	105,301	83	235,667
May	27	73,846	94	269,752
April	27	82,382	83	234,550
March	19	55,501	81	243,065
February	36	105,233	90	259,085
January	31	96,074	79	249,575
December, 1923	30	86,444	75	219,325
November	24	65,263	83	239,807
October	18	56,473	65	188,805
September	14	37,823	65	184,646
August	36	113,070	81	244,366
July	41	108,465	108	296,197
June	31	107,218	66	190,218

Galveston

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1924	41	133,079	55	170,181
May	58	148,758	69	200,846
April	54	154,343	67	196,610
March	57	176,379	88	287,398
February	55	152,950	80	236,761
January	70	210,110	96	317,105
December, 1923	71	219,767	106	313,231
November	61	172,824	95	301,148
October	83	209,343	108	334,544
September	64	164,854	100	290,715
August	69	172,330	92	257,371
July	70	178,601	77	198,200
June	77	178,013	82	209,893

Key West

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1924	54	65,770	58	71,102
May	98	110,675	95	104,661
April	92	95,435	85	90,677
March	103	112,577	89	97,276
February	83	83,118	78	84,678
January	69	79,224	70	82,775
December, 1923	71	88,377	71	91,121
November	80	97,642	85	97,599
October	83	103,328	82	95,506
September	69	77,687	74	84,612
August	80	94,591	82	93,028
July	88	96,514	86	97,260
June	93	105,045	93	102,123

Portland, Oreg.

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1924	26	90,286	33	115,504
May	27	103,891	32	118,406
April	23	85,301	35	130,528
March	12	47,848	25	97,674
February	30	99,748	34	120,487
January	30	113,362	34	120,487
December, 1923	21	78,191	48	174,275
November	23	86,194	41	138,470
October	17	64,218	31	106,478
September	19	66,048	24	86,474
August	22	87,147	25	87,419
July	16	58,889	21	72,663
June	17	62,287	22	84,940

New Orleans

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1924	240	622,326	223	588,554
May	260	703,950	264	696,397
April	249	646,315	262	653,740
March	225	542,040	222	538,642
February	217	604,411	227	610,455
January	217	595,087	220	588,703
December, 1923	239	632,193	231	634,300
November	216	375,102	218	605,923
October	226	605,211	239	649,791
September	205	548,914	169	444,881
August	235	605,671	249	639,802
July	237	602,017	227	587,966
June	230	584,271	226	572,211

San Francisco

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1924	54	188,984	57	196,854
May	63	226,130	62	197,082
April	52	161,882	72	172,155
March	57	190,588	62	210,134
February	53	185,226	59	211,896
January	65	215,020	68	229,206
December, 1923	63	209,105	68	234,960
November	69	281,081	70	243,152
October	56	205,175	71	249,035
September	43	165,798	63	209,930
August	64	208,625	65	224,918
July	68	244,530	58	189,348
June	59	204,204	65	227,566

Seattle

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1924	50	211,828	45	175,319
May	46	188,853	43	177,581
April	46	196,591	53	220,763
March	57	236,620	45	191,152
February	48	189,146	54	213,851
January	57	233,002	60	242,577
December, 1923	48	206,466	52	224,112
November	48	199,115	46	191,022
October	39	184,717	47	200,668
September	32	142,052	40	159,006
August	39	173,885	37	163,188
July	30	148,607	32	149,239
June	36	147,186	39	184,732

Mobile

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1924	90	196,589	73	164,783
May	74	146,668	80	157,655
April	80	158,109	70	133,920
March	83	178,637	84	182,491
February	79	168,182	86	174,517
January	81	158,416	83	159,081
December, 1923	83	165,163	75	156,579
November	74	148,297	78	145,886
October	68	123,532	60	120,606
September	60	126,005	52	105,247
August	64	191,968	67	146,191
July	73	136,242	66	123,405
June	64	136,311	61	132,863

Houston

(Exclusive of Domestic)

Month	—Entrances—		—Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1924	65	74,794	72	336,312
May	72	64,937	71	362,350
April	78	76,466	73	337,757
March	88	113,064	87	411,715
February	62	82,601	65	228,178
January	60	55,037	58	267,068
December, 1923	74	73,876	70	304,359
November	84	83,490	82	350,703
October	75	24,076	70	268,416
September	66	58,704	61	92,664
August	58	43,258	56	211,348
July	48	42,447	48	177,666
June	49	72,875	50	197,081

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specialty Compiled for Marine Review

By Harry Bowne Skillman

Attorney at Law

ONE of the accepted functions of a sovereign is to regulate the ships under his flag on the high seas and the conduct of its citizens while on those ships. That authority has been exercised, and repeatedly sustained by the courts. Under the constitution of the United States, article 1, section 8, clause 3, permitting the regulation of foreign commerce, clause 10, authorizing the definition of felonies on the high seas, and clause 18, authorizing laws required for the effective exercise of the powers of the government, congress has power, if it sees fit to do so, to make the statute prohibiting the presenting of false claims against a governmental agency applicable on the high seas. For the purpose of determining the applicability of the criminal laws, the high seas outside of a marine league from the shore and outside of the jurisdiction of any particular state are constructively a part of the territory of the United States, and are peculiarly within the jurisdiction of the United States, as distinguished from that of the states.—United States v. Bowman, 287 *Federal Reporter* 588.

Though a charter party containing the usual exception of "extraordinary occurrence" beyond control of either party was entered into after the outbreak of the European war, so that the parties must have contemplated the risks incident to transporting the cargo specified, which was deemed contraband by Germany, to a port in the British Isles, the subsequent declaration by Germany of unrestricted submarine warfare and intention to sink without warning any merchant vessel found within a zone around the British Isles, was an extraordinary occurrence which justified the owner in thereafter refusing to perform the charter.—M. A. Quina Export Co. v. Seebold, 287 *Federal Reporter* 626.

"Seaworthiness depends, not only upon the vessel being staunch and fit to meet the perils of the sea, but upon its being fit to transport the particular cargo which it is to carry. Unless it is able to transport that it is not seaworthy. And it may be seaworthy as to one sort of cargo and unseaworthy as to another. * * * The cargo which this vessel was to carry consisted * * * of 32,809 bags of linseed. To make a vessel seaworthy for the carriage of bags of linseed which were susceptible to damage by water, it is essential that the ship should be provided with adequate dunnage to keep the cargo from contact with any portion of the boat where water may be reasonably expected to appear during the voyage. * * * There must be sufficient dunnage in the bilges to protect the cargo in that part when the ship rolls.

* * * So a vessel must be lined inside, if the cargo is of such a character as to require lining to perfect it. * * * And the dunnage must be sufficient to prevent damage to the cargo from leakage, where the vessel is likely to leak on the voyage."—ADDISON E. BULLARD, 287 *Federal Reporter* 674.

* * * Where the government sold ships for a stated price, and the stores therein were separately appraised and paid for, on retaking the ships under the contract for default in payment, it can not claim, it was held in the case of Atlantic, Gulf & Pacific Steamship Corp. v. United States, 287 *Federal Reporter* 714, that the ships include the stores on board, but such stores are the property of the purchaser.

* * * A salvage service, which protects the rest, and without which service the security of the seamen might be lost, outranks prior seamen's wages.—NIKA, 287 *Federal Reporter* 717.

* * * The oral contract of a time charterer to carry a cargo does not bind the ship; the only contract which does is the bill of lading of its master, or of some other duly authorized agent of the owner. Where a vessel is under a time charter, the master ratifies all bills of lading signed by the charterer when he sets sail, and thereafter such bill of lading is the measure of the ship's duty and the cargo's "privilege," but such ratification does not extend to oral contracts of carriage made by the charterer personally.—BLANDON, 287 *Federal Reporter* 722.

* * * Acceptance by seamen of part of an amount due them as wages is not a valid consideration for the surrender by them of that part to which they were entitled.—JONES v. United States, 284 *Federal Reporter* 721.

* * * Where a seaman, discharged four days after he had shipped immediately made application under revised statutes, section 4527, giving a seaman wrongfully discharged before one month's wages are earned an extra month's wages, and on the same day of the discharge the captain revoked the discharge, but the seaman refused to report back to the ship, the said seaman was not entitled to an extra month's pay.—MERON, 287 *Federal Reporter* 531.

* * * "All shipowners carrying goods by sea, whether common carriers or only bailees for transportation, are under an absolute warranty, implied by law, to furnish a vessel seaworthy at the beginning of the voyage. * * * A private carrier can, of

course, relieve himself of this implied warranty by contract, while a common carrier can not do so, in this country, except in conformity with the Harter act. In a charter of a tank steamer as bailee for transportation of a cargo of oil, containing a general warranty of seaworthiness during the voyage, perils of the sea excepted, a further clause, that "the steamer is not to be accountable for leakage," modified the general warranty and relieved the vessel from liability for leakage, whether or not caused by negligence.—G. R. CROWE, 287 *Federal Reporter* 426.

* * * A repudiation of a subcharter contract by the original charterer does not constitute a breach of the subcharter where the other party does not accept it as a breach.—TAMPICO, 286 *Federal Reporter* 482.

* * * Recital in a bill of lading that goods were received in apparent good order merely creates a presumption in favor of the shipper, and does not shift from him the burden of proof that the damage occurred on board the ship.—DONDO, 287 *Federal Reporter* 239.

* * * Where a charterer breaches the charter party by refusing to furnish the cargo, the shipowner is entitled to recover the net amount which would have been earned under the charter sued on, less the net amount earned, or which could with reasonable diligence have been earned, during the time required for the voyage named in the charter.—AINESWORTH COAL & IRON CO. v. TRAFIKAKTIEDOLLAGE GRANGESBERG OXELÖSUND, 287 *Federal Reporter* 291.

* * * The United States has the inherent right as an owner of a vessel to recover compensation for salvage services in accordance with the ancient doctrine of the maritime law, and this is not affected by acts of congress showing a long practice of the United States not to ask for salvage compensation, though congress may restrict the inherent right of the United States to claim salvage: this, however, was not done by act of June 30, 1864, section 29 (Rev. St. Section 4652), act Dec. 22, 1837 (Rev. St. Section 1536), and act of Aug. 1, 1912. A salvaged vessel, it was further held in the case of IMPOCO, 287 *Federal Reporter* 400, should not be asked to pay for expenses incurred by the salvaging vessel after the service ended, due to delay caused by difficulty in getting coal, or to pay for employment that the salvaging vessel might possibly have got, and negligence of the salvaging vessel should be considered, where it causes injury.

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review

By Harry Bowne Skillman

Attorney at Law

PERSONS largely engaged in handling boats without motive power of their own in New York harbor are charged with the duty of keeping themselves informed of expected changes in weather conditions ascertainable at the office of the weather bureau, and of instructing masters of their tugs accordingly, when dangerous storms or winds are predicted.—O'Brien Bros., Inc. v. Director General of Railroads, 287 *Federal Reporter* 543.

Even though a tug and tow were unquestionably at fault for failing to have proper lights on the tow, a steamship which collided with the tow was at fault, it was said in the case of *EURYADES*, 287 *Federal Reporter* 354, for not realizing that the lights which were carried were those of a tow, after being apprised by the lights on the tug of the existence of a tow.

Where the owner of a tug had contracted to tow ordinary wooden box barges of the usual type and construction, designed chiefly for transportation within harbors and inland waters, from New York to Boston in the winter time, the tug was not an insurer, but was bound to use reasonable skill and care, and to take advantage of the most favorable conditions of wind and tide, avoid the hazard of exposing them to heavy seas, and to be within reach of a sheltering harbor when a storm threatened. The owner of such barges, in offering them for towage from New York to Boston in the winter season, acquiesced in subjecting them only to the hazards which could not be avoided by reasonable care and skill on the part of the tug, and the captain of the tug, in sole command of tug towing barges, had the duty of arranging the barges in the tow as he deemed best for their safety, and to determine the length of hawser between them under all conditions.—Peace River Phosphate Mining Co. v. Mulqueen, 285 *Federal Reporter* 102.

The provision of a six months' time charter for hire *pro rata* for any fractional part of a month (the days to be taken as fractions of a month of 30 days) until her redelivery to the owner, which admittedly applied to hire if the vessel was held over after the expiration of the chartered period, was held, in the case of *KNUD II*, 285 *Federal Reporter* 142, to apply also to the periods during any calendar month that the vessel was off hire because of breakdown or other accident preventing its working, so that, in such a case, the hire under the charter was to be figured for the time the vessel was actually on hire,

in accordance with that rule, and the monthly hire paid in advance was not to be considered as a payment for the ensuing calendar month, regardless of the number of days, and the time the vessel was off hire deducted therefrom.

Where both a ship and injured stevedores were in substantial fault contributing to the injury, damage must be divided.—*DEVONA*, 285 *Federal Reporter* 173.

A carrier can not avoid liability for the consequences of its own negligence by a notice to that effect, unless the relief from liability is agreed to by the terms of the contract of carriage, and this rule applies, it was decided in the case of *McWilliams Bros. Inc. v. Davis*, 285 *Federal Reporter* 312, to the liability of a tug owner for its negligence in the care of a barge intrusted to the tug for towing. It was also held that tug masters working about the harbor of New York are bound to take notice of weather warnings and to protect their moored tows accordingly.

A charter of scows in the form of a letter providing that the charterer agreed to return the scows in as good condition as when received less ordinary wear and tear, but further providing that if any accident happened to the scows, or they were damaged, the owner, if able to collect from the insurance company, would not hold the charterer liable, unless compelled to do so by the insurance company did not absolutely guarantee the return of the scows in as good condition as received, according to the decision in the case of *Wandell v. New Haven Trap Rock Co.*, 285 *Federal Reporter* 339, but merely provided an exemption from liability if the owner collected the insurance without suit. "A covenant to insure is not implied," said the court, "and can only be imposed where it is found in an agreement by clear and explicit language."

"This law is well settled," it was said in the case of *TENNESSEE*, 285 *Federal Reporter* 391, "that steam vessels, navigating or undertaking to navigate in narrow channels or in waters crowded with other craft, are required to exercise extraordinary care to avoid coming in collision, and steam tugs with tow must be navigated with such a degree of carefulness as to avoid meeting and passing in congested places, or in localities where it may fairly be anticipated that mishap will result, or is likely to result, from doing so. This rule applies with especial force to large tows, which require using nearly the whole channel.

Vessels must not only give notice of their approach, but also give assistance to vessels coming from an opposite direction and having the right to pass, and measures commensurate with the circumstances must be taken to keep out of harm's way."

The fact that the corporation furnishing supplies to a vessel and the corporation owning the vessel had largely the same stockholders and many of their officers were identical does not make the supply corporation a part owner of the vessel, nor indicate that the supplies were furnished on the credit of the owning corporation, if the managing officers of the two corporations, by whom the supplies were sold and purchased, were different, and it did not appear that the supply corporation used its relationship to compel the vessel to purchase supplies from it, and hence a lien for the supplies would not be denied. A maritime lien is denied through a party, who would otherwise be entitled to it because of his relation to the vessel, only when he is either a real part owner of the vessel, occupies a fiduciary relation toward her and her owners, or deals with himself on her account; that is, it was held in the case of *GLOUCESTER*, 285 *Federal Reporter* 579, the lien is denied because of insuperable legal difficulties in the enforcement of it, or because to recognize it would be inequitable to the other claimants.

"The admiralty courts have from the earliest days been solicitous to protect seamen from imposition, because, through the nature of their occupation, they have been regarded as likely to be improvident and susceptible to fraud, and their wages were, therefore, held not subject to assignment. In recent years, however, the trend of decision has been otherwise, where it has clearly appeared that there was no fraud or overreaching upon the part of the assignee. *** It is now regarded as important that a maritime lien should be assignable, because a non-assignable claim is of doubtful value, and in many cases a seaman is better off to assign his claim, get his money, and sign up on another ship, than to wait until his claim can be paid out of the proceeds of a sale. I think the best reasoning is in favor of such claims, and the liens therefor being assignable."—*BETHLEHEM*, 286 *Federal Reporter* 400.

Where a bill of lading recited the receipt of merchandise in good order, the burden rested on the vessel, it was held in the case of *TAURUS*, 286 *Federal Reporter* 435, to justify its delivery in bad order, or to bring the cause of damage within some exception of the bill.

Practical Ideas for the Engineer

Proper Use of Engine Indicators Will Enable Both Owner and Engineer To Check Efficiency of Ship Plant

AN ACCURATE indicator diagram intelligently analyzed, graphically represents what goes on within the closed walls of the cylinder of a reciprocating engine throughout the cycle of the piston. It is just as reasonable to expect a blind man to walk in a straight line as it is to expect an engineer to possess a comprehensive knowledge of the performance of an engine without taking indicator cards periodically. To be sure an overall rough approximation (too often the case) may be made on the basis of the amount of coal or oil burned and the output of the engine in useful work. Such methods, however, lump all the factors involved in efficiency and do not help in segregating these factors for detailed study leading to improvement. Taking the case of a ship, the boilers, the engine, and the lines of the ship, the condition of the bottom and dimension and pitch of the propeller, all, or a combination of two or more of these, or any one of these factors, may be at fault.

The total indicated horsepower can be determined by properly taken cards using a reliable indicator. Though important, this is not the primary reason (a torsion meter will give accurately the brake horsepower at the shaft and this may be converted to total indicated horsepower by the use of a constant, with a reasonable degree of accuracy) for taking indicator cards. Of far greater importance is the information derived from study of the cards taken, concerning the behavior of the steam or gas throughout the cycle of operation of the pistons in each cylinder.

Watching the Card

Any one experienced in the analysis of indicator cards can tell with a certain degree of closeness the point at which steam is admitted, the rise of pressure from this point to the highest or initial pressure at the beginning of the stroke, the steam line to the point of cut off or where the admission of steam is stopped by the closing of the steam valve, the expansion curve showing the fall in pressure as the steam expands to the point of release when the exhaust valve opens, the exhaust line showing drop in pressure to the end of the stroke, the back pressure line or the pressure acting on the piston on its return stroke, the point of closing exhaust toward the end of return stroke and the compression curve showing the rise

in pressure due to compression after the exhaust valve has closed. Such an analysis will show whether the action of the valves is correctly timed in relation to the motion of the piston and the adjustment necessary for maximum economy and efficiency, the condition of the valves and piston with regard to leakage, and the power lost through such causes, and also certain features of design such as the proportion of the total power in each cylinder and adequacy in size of ports and passages.

It is a fair presumption that the shipyard or the builders of reciprocating engines whether steam or oil, thoroughly appreciate all the elements of design and construction, and consequently that this product of their labors will be properly proportioned, that ports and passages will be correct in size, and that the pistons and valves will be accurately fitted and that the latter will be correctly timed for maximum efficiency. Serious attention should be devoted by the builders (the owners should specifically insist upon this) to working out in

detail the best and most accessible location of indicator connections to top and bottom ends of each cylinder and also the arrangements for attaching the drum operating cord to the crosshead of the engine or to any moving part that has an exactly corresponding motion, with the direct object in view of making it possible to take accurate indicator cards under operating conditions with minimum difficulty and inconvenience.

Use Data From Trial Trip

At the completion of a ship, a sea trial is held to demonstrate satisfactory operation. On this trial with the ship in fully loaded condition and running at full designed speed, indicator cards should be taken at top and bottom for each cylinder. These cards should be carefully analyzed by the builder's engineers in conjunction with representatives of the owners and if found unsatisfactory in any way adjustments to the engine should be made and a new set of cards taken. This process, if necessary, should

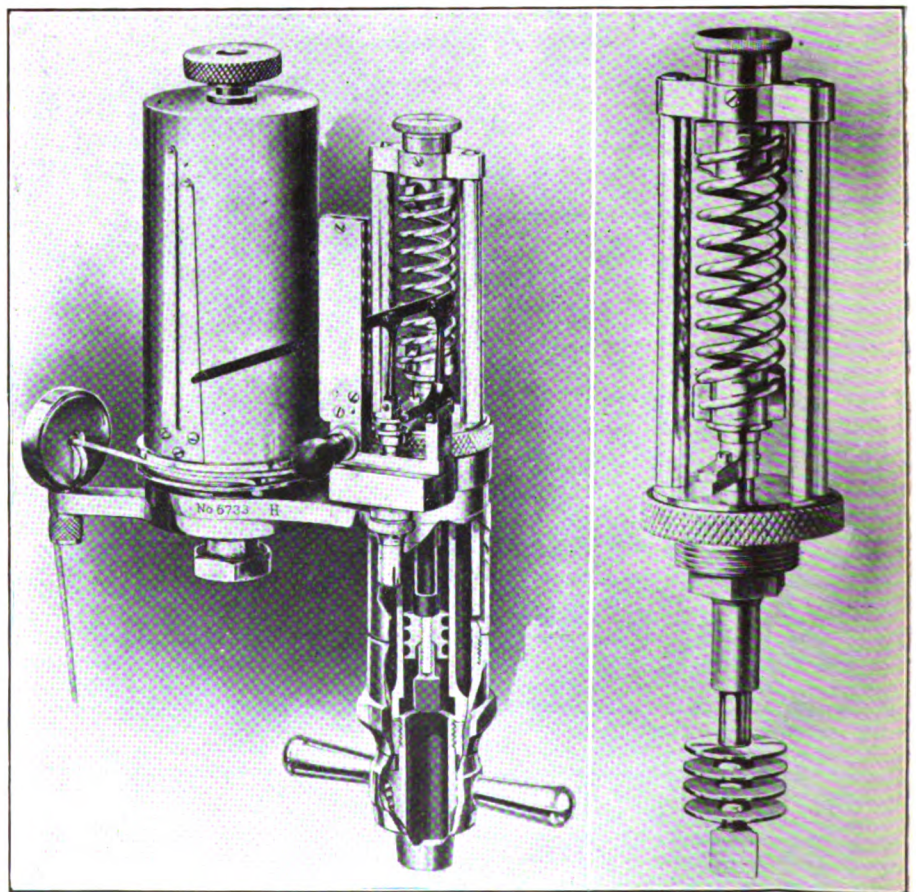


FIG. 1—INDICATOR SHOWING CONSTRUCTION OF CYLINDER. FIG. 2—PISTON DESIGNED TO HAVE EFFECT OF FOUR SEPARATE UNITS

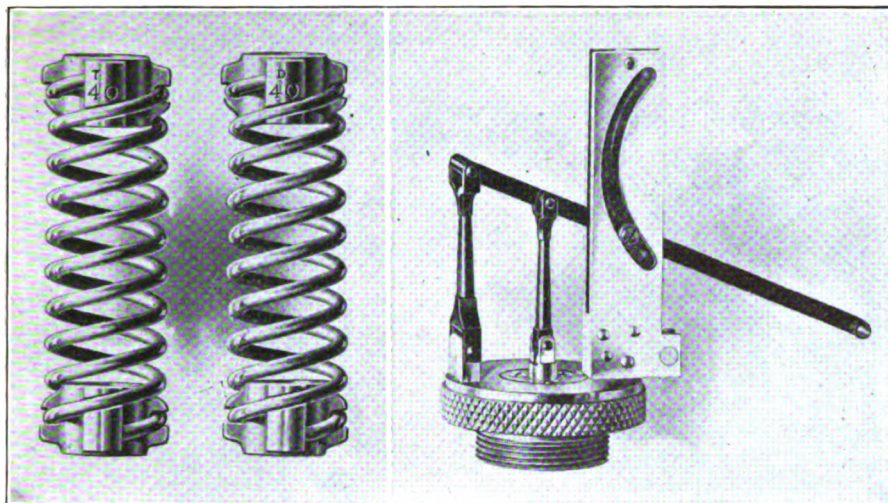


FIG. 3—DUPLEX TYPE SPRINGS. FIG. 4—PARALLEL MOTION

be repeated until all of the indicator diagrams are entirely satisfactory. A duplicate set should then be taken.

All data, draft of ship, condition of bottom, speed, revolutions per minute of shaft, location of trial run, weather and sea condition, apparent slip, propeller characteristics, boiler pressure, receiver pressure, vacuum, temperature of hot well, temperature of sea water, engine characteristics and setting of valves and any other data which might have any relation to the performance of the ship should be carefully noted. One set of these cards with the above data should become a part of the permanent record of the ship to be mounted under glass in a frame and hung in the chief engineer's room over his desk. The other set with data should go to the representative of the owners to be kept on file always readily accessible as a record of correct performance of the engine.

Checking the Record

Having thus in the first place worked out in a practical manner, the actual physical taking of the cards so that this function can be correctly and easily performed at any time desired and having established and preserved a record of proper performance of the engine, a continuous intelligent check can and should be maintained after the entry of the ship into service, by requiring that indicator cards be taken at regular periodic intervals and by a careful comparison of these cards with the standard records. By this means, an accurate account of the efficiency of the engine is always at hand and the adjustments or repairs necessary to keep this efficiency at the highest point possible are known and can be carried out. All of the above is of great importance in economical operation and can be worked out without extra cost or hindrance in any way to the regular routine operation of the ship, by giving to the matter a little thought and making once for all, the necessary

arrangements and the plan of procedure.

The principles of design and the choice of materials used in the construction of engine indicators have received a great deal of deep study and elaborate experimentation with the view of improving accuracy, simplicity, strength and wearing qualities. Several different manufacturing concerns and the scientific research of engineering schools have contributed to the perfection of the apparatus. Among the former, the Ash-

Croft Mfg. Co., Bridgeport, Conn., established in 1851, specialist in pressure gages, has been engaged in the manufacture of indicators for a period of nearly 40 years. The accompanying illustrations show the indicator manufactured by this company.

Description of Indicator

The type shown in Fig. 1 is appropriate for the indication of steam engines or for use with air, hydraulic or other pressure mediums which will not affect its bronze interior mechanism or parts, for a pressure up to 325 pounds per square inch. A duplicate of this indicator with the exception that it has a piston of one-quarter square-inch area in place of the one-half square-inch area piston, is used for the indication of gas engines under high pressures and for other engines where the pressures are in excess of 325 pounds per square inch. For any pressure mediums that would have a deleterious effect on the bronze interior mechanism such as ammonia gas, in refrigerating machines, all portions exposed to such media are made of steel to prevent deterioration from corrosion.

Certain interesting characteristics feature the indicator shown in Fig. 1. The cylinder is designed with an inner and outer shell so that the inner or wearing

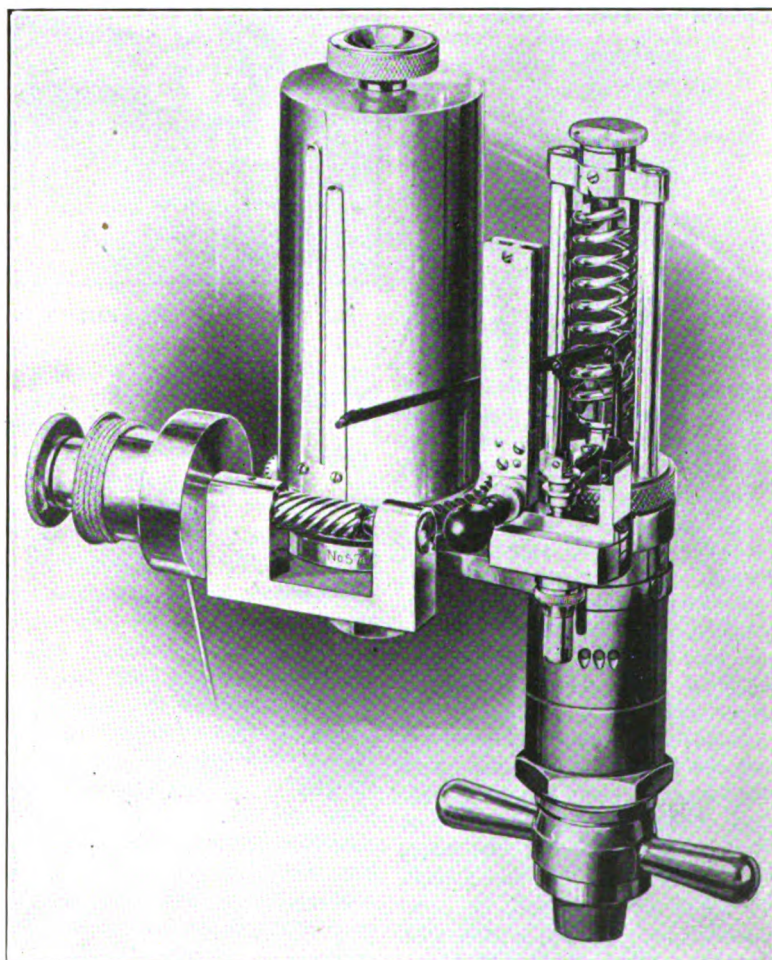


FIG. 5—INDICATOR WITH REDUCING MOTION ATTACHED

parts may be replaced without disturbing the outer. Maximum resistance to wear is obtained by use of a special hard bronze for the inner shell. By steam jacketing the inner cylinder, radiation and resultant condensation and pressure drop is reduced to a minimum. One of the latest improvements is in the piston shown in Fig. 2, which is designed to have the effect of four separate pistons with deep sections between them. In operation these sections fill with condensate and oil which gives good lubrication and a tight cylinder.

Referring to Fig. 3, the springs are of the duplex type, formed by two coils of wire of exactly the same pitch and attached directly opposite each other to two threaded connections. In this way, the tendency of the piston to cock or bind is eliminated, friction in the piston is reduced to a minimum and the strains are evenly divided. The atmosphere line is fixed in its proper location on the card by varying the length of the springs for each denomination, obviating the necessity of adjustment and so eliminating a certain amount of lost motion in the adjusting mechanism. By the outside spring design, the spring is protected from the deteriorating effect of high temperature, and greater accuracy and durability are attained.

Control of Pencil Point

Accuracy, a minimum of friction, and motion of the pencil point exactly parallel to that of the piston, is accomplished by the parallel motion shown in detail in Fig. 4. To prevent the pencil point from pressing too hard against the card, a stop device furnished with a small wooden handle is provided. The paper drum is strongly built, at the same time so light that inertia effects are minimized. The ratio of travel between the pencil point and the piston is 5 to 1.

A reducing motion of some sort is necessary in order to reduce the engine stroke to a length within the limits of the indicator drum. The apparatus shown attached to the indicator drum support in Fig. 5 known as the Hough-taling reducing motion is furnished for this purpose. A variation of this reducing motion is also supplied to fit any indicator. A worm shaft directly engages a gear on the drum carriage. A pulley, chosen so that its diameter is about one-twelfth of the length of the engine stroke, runs free on one end of the worm shaft and has connected to it the actuating cord from the crosshead. This cord should encircle the pulley a sufficient number of times so that when unwound its length is a little greater than the engine stroke.

By throwing in a clutch pin operated by means of a swivel thumb piece, the pulley is secured to the worm shaft and

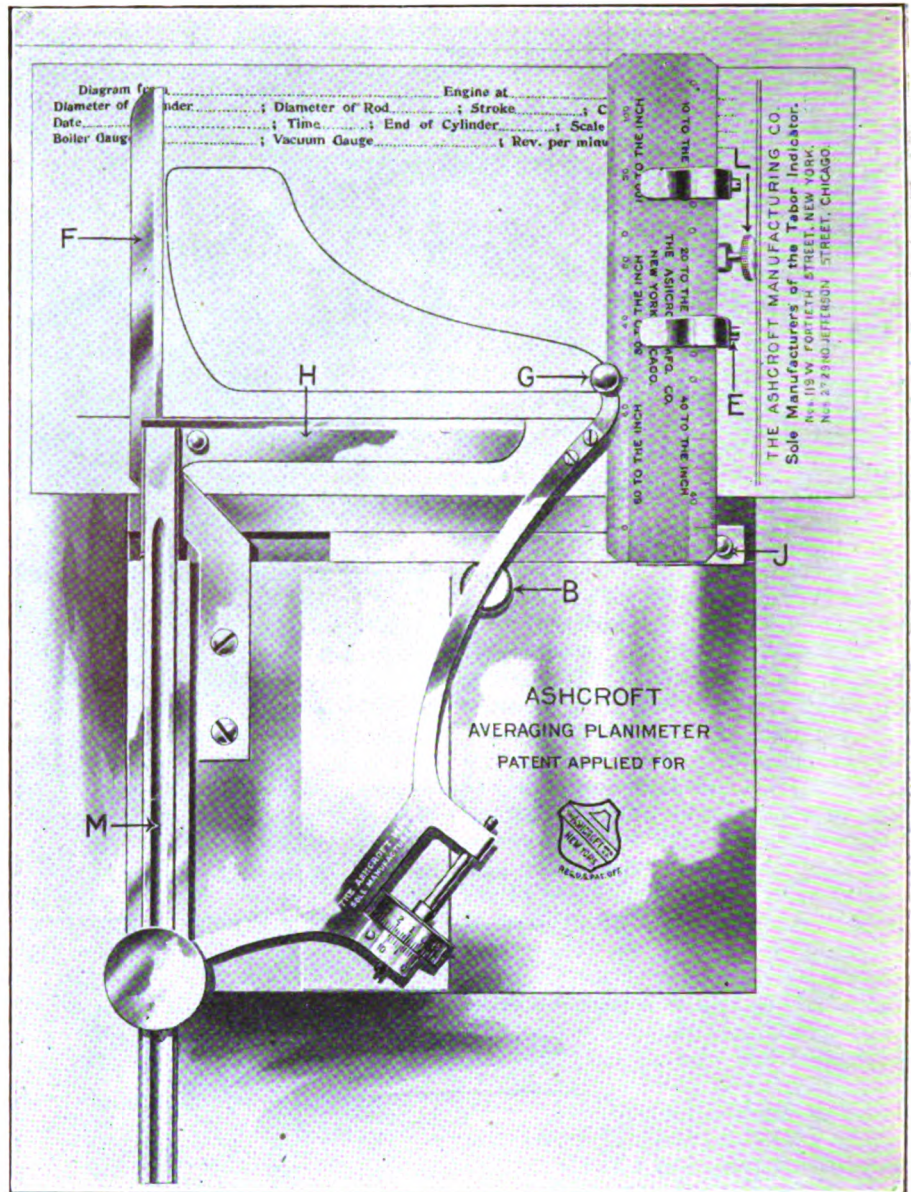


FIG. 6—AVERAGING PLANIMETER

the paper drum is rotated forward through the action of the cord around the pulley. The other end of the cord is connected to a moving part of the engine. In the reverse direction, the pulley is overhauled by means of a spiral spring in the spring case connected with the base piece and adjacent to the pulley.

Dimensions of the standard indicator are:

	Inches
Diameter of large piston	0.7978
Diameter of small piston	0.5642
Range of pencil motion	3.00
Stroke of drum	5.25
Diameter of drum	2.03
Height of drum	4.00

Ratio of multiplication of piston movement 5 to 1.

Dimensions of the small drum indicator are:

	Inches
Diameter of large piston	0.7978

Diameter of small piston	0.5642
Range of pencil motion	2.35
Stroke of drum	3.75
Diameter of drum	1.50
Height of drum	2.875

Ratio of multiplication of piston movement 5 to 1.

The springs for use with the indicator range in scales from 8 to 200 and from 250 to 450. The latter are extra long requiring a special yoke. Each special yoke, however, is provided with an adapter so that springs of 200 scale and lighter can be accommodated. The scale number is stamped on the spring header and represents the pressure in pounds per square inch required to make a diagram 1-inch high with $\frac{1}{2}$ square inch area piston. For speeds up to 200 revolutions per minute the spring should be selected so that its scale number is as nearly as possible one-half of the working pressure. For high speeds, lesser diagram heights are desirable, such

as, at 400 revolutions per minute, about $1\frac{1}{2}$ inches and for still higher speeds, 1 inch. Where higher pressure are to be indicated, smaller area pistons should be used. The following areas can be obtained, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $1/10$, $1/32$, and $1/100$ -square inches. The indicated pressure for a certain scale spring will be inversely in proportion to the piston area, that is, with $\frac{1}{4}$ -square-inch area piston the value is doubled and with $1/100$ -square-inch area piston, the value is 50 times as great as with $\frac{1}{2}$ -square-inch area piston.

Indicator diagrams should be taken from both ends of the cylinder for correct conclusions. The diagram from one end of the cylinder may be satisfactory while the one from the other end may not be good due to improper or uneven valve setting or other causes. The indicated horsepower may be calculated after obtaining the mean effective pressure by the well known formula:

$$\text{I.H.P.} = \frac{A \times \text{M.E.P.} \times V}{33,000}$$

$$\text{Where } A = \frac{A + (a-p)}{2} = \text{square inches}$$

and a = area of piston in square inches
while p = area of piston rod in square inches

M.E.P. = average mean effective pressure per square inch both ends of cylinder.
 V = piston speed in feet per minute = $\text{R.P.M.} \times 2 \times L$.

and R.P.M. = revolutions per minute
 L = length of stroke in feet.

The mean effective pressure is the result obtained when the area of the indicator card in square inches, divided by the length of the card in inches, is multiplied by the spring scale. In obtaining the mean effective pressure, therefore, it is necessary to determine the area of the indicator card and to divide by the length. The area may be determined by dividing the diagram into a large number of parts and summing up the areas of the respective rectangles so formed. By the use of a planimeter, the area can be determined directly. In Fig. 6, an averaging planimeter is shown by means of which, in conjunction with a boxwood rule marked in the same scale as that for the spring used in taking the card, the mean effective pressure may be read off at once. Place the card in proper position under an arm of the instrument and adjust the boxwood scale vertically so that its zero mark is opposite an extreme right hand point of the diagram, move the pointer over the outline of the diagram, and finish by running the tracing pointer up along the scale until the reading on the indicator wheel in relation to the vernier is back to zero or the original reading on starting. The reading on the

boxwood scale adjacent to the final position of the tracing pointer is the mean effective pressure in pounds per square inch.

Tells Condenser Tube Facts in New Booklet

The solution of the problem as to why condenser tubes fail would mean an important saving in the operation of steam power plants on board ships. All operating and superintending engineers are familiar with condenser tube failures but probably few are familiar with the essential facts concerning the manufacture of condenser tubes and the causes of failure in so far as such causes are known by authorities who have devoted years of practical and technical study to the subject. Individual engineers have only their own experiences to go by to guide them in the prevention of failure. Wide general experience and the collection of facts relative to failure in numerous different installations and the study of the operating conditions under which such failures occur in connection with accurate knowledge of the physical, chemical and microscopic properties of the metal in the tubes and of the methods of manufacture, must be looked for among the progressive manufacturers.

The results of a great deal of intelligent and intensive study devoted to this subject are of the greatest value in pointing the way to longer condenser tube life and also in establishing sensible limitations eliminating extravagant claims and in doing away with erroneous theories in regard to the relation between elaborate specifications and the life of the tubes.

A clean cut discussion in plain language on the process of manufacture, the importance of proper proportions in the alloy used and the causes for failure in operation of condenser tubes, is found in a 22-page illustrated pamphlet entitled "Condenser Tubes" recently published by the Bridgeport Brass Co., Bridgeport, Conn. Originally presented as a paper before a section of the American Society of Mechanical Engineers, in New York last fall by W. R. Webster, vice president of the company, the contents of this pamphlet will appeal to all engineers. It is a valuable contribution by an authority, to the efforts under way to turn out a product controlled at every step of manufacture by all scientific methods known to the end that the physical and chemical properties will be exact and correspond to those having given the best results in practice under the severest conditions of serv-

ice, and also as a forceful reminder of the necessity of correct design and careful operation of the condenser.

The pamphlet is written in an interesting and readable manner. One hour's study will give any engineer a better understanding of the methods of manufacture and the physical and chemical properties definitely known as affecting the resistance of tubes to failure, and also of the great importance of care in the operation of the condenser to guard against the same difficulties and to give good tubes a fair chance.

U. S. S. Colorado Sets Records on Trial

The electrically propelled superdreadnaught COLORADO successfully completed her official trials on July 10 under the direction of Rear Admiral C. H. Burroughs, U. S. N., president of the board of inspection and survey. Capt. Reginald R. Belknap, of North sea barrage fame, commander of the COLORADO and Commander L. T. Leighton, engineering officer, were responsible for the excellent records achieved.

The final trials were held off Cape Cod and consisted of an 8-hour full power run, a 4-hour economy run, reversal speed at 16 knots, steering test at 16 knots, astern to ahead at 16 knots without giving signals, full power steering ahead, reverse full power, steering astern at full power, reverse astern to ahead, steering test on auxiliary electric gear, making tactical diameters and the figure eight.

The most spectacular of these was when the 32,600 ton dreadnaught was reversed from a speed of 21 knots ahead to full power and speed astern. She came to a dead stop in approximately three and a half minutes within a distance of a thousand yards. The four screws still reversing at full power and speed sent the COLORADO astern about 17 knots and sent the spray of the parting waters up on the quarter deck. The performance was so smooth that a filled glass of water on a table did not spill. The COLORADO turned the figure eight at full speed in a graceful manner which was highly pleasing to the trial board. In the full speed trials run over the standardization course off Rockland, Me., the COLORADO with a 1500-ton excess tonnage exceeded her contract speed at 21 knots by maintaining an average speed of 21.27 knots for three consecutive full power runs. She attained a maximum speed of 22.06 knots developing 37,400 shaft horsepower at about 180 revolutions per minute, a record for ships of her class.

The propelling machinery consists of four Westinghouse 8375 horsepower in-

duction motors supplied with power by two Westinghouse 15,000 kilovolt ampere turbine generators. The steam for the turbines is generated by fuel oil burning boilers.

After the successful trials on which all the contract requirements were surpassed, the *COLORADO* proceeded to Presidents Road, Boston, to take on fuel oil for a cruise to Hampton Roads after which she will proceed to southern waters off Bermuda for testing the gun fire control apparatus. She will then return to a marked range off Hampton Roads, about Aug. 11, for calibration tests of her eight 16-inch 45 caliber guns. She will then leave to join the Pacific

fleet, pass through the Panama canal, and according to present orders, arrive at San Francisco on Sept. 8.

Captain Belknap, during January and February, took the *COLORADO* on a shake down cruise to European waters which gave 1410 officers and crew a chance to visit historic points in England, France and Italy. Receptions were given by the countries visited and on the ship.

The *COLORADO* was built by the New York Shipbuilding Co., Camden, N. J. Her keel was laid before the World war and the ship was finished in accordance with the naval limitations treaty. She is 624 feet long, displaces 32,600 tons, has a speed of 21 knots, and embodies

all the latest ideas for protection against submarine and airplane attacks.

The United States board of inspection and survey was represented on the trial trip by Rear Admiral C. H. Burrage, president of the board; Capt. J. G. Awressey, Capt. I. E. Hass, Lt. Commander V. D. Herbster and Lt. Commander J. H. X. Dessez, recorder. The Westinghouse Electric & Mfg. Co. was represented by H. M. Southgate, manager of the government office and its engineers, W. D. Flanders, W. E. Thau and J. J. Brown; the Babcock & Wilcox Co., by J. H. King; Waterbury Tool Co., by M. Burr and the Hyde Windlass Co., by M. Butterfield.

11 Committees Study Marine Standards

SEVEN committees of experts in marine construction and operation late in July held their first meetings to begin studies preliminary to efforts to improve American shipping through greater standardization and simplification. The division of simplified practice, department of commerce, is co-operating with the American marine standards committee in this effort. Four of these committees met in Philadelphia and three others in New York. An eighth committee, which has held previous sessions, also met in New York.

The first meeting took place in the offices of the Emergency Fleet corporation in Philadelphia on July 21. This committee is on "Gages and Instruments," and its aim will be to recommend for adoption as marine standards, types and sizes deemed essential for marine service. The chairman of the committee is J. C. Shaw, assistant chief engineer of the William Cramp & Sons Ship & Engine Building Co., Philadelphia. Other members are Charles C. Brush, assistant engineer of the bureau of lighthouses; H. B. Nickerson, vice president of the American Schaeffer & Budenberg Corp., Brooklyn, N. Y.; R. P. Brown, president of the Brown Instrument Co., Philadelphia; Lieut. Commander C. S. Gillette, bureau of engineering, U. S. N.; E. F. Mueller, assistant chief of the heat division, bureau of standards; W. D. Frayne, department of maintenance and repair, Emergency Fleet corporation, New York; and W. D. Fletcher, technical assistant, Standard Transportation Co., New York.

Two meetings were held on July 22. One committee, on "Cargo and Oil Tight Hatch Fittings" met in the morning, and another committee, to study "Cargo Booms—wood and steel

—Boom Fittings and Miscellaneous Deck and Rigging Fittings" met in the afternoon. The former committee is headed by J. W. Hudson, naval architect of the Sun Shipbuilding & Dry Dock Co., Chester, Pa. Other members are E. L. Stewart, naval architect of the Standard Oil Co. of New Jersey; W. R. Bean, assistant naval architect of the New York Shipbuilding Corp., Camden, N. J.; H. H. Thayer, consulting naval architect, Philadelphia; Commander H. S. Howard, bureau of construction and repair U. S. N.; Arthur Aldrich chief hull draftsman, Baltimore Drydock plant, Bethlehem Shipbuilding Corp. Ltd., Baltimore; W. D. Fletcher, technical assistant, Standard Transportation Co., New York

Members of Committee

The personnel of the committee on cargo booms includes: Chairman, John C. Craven, naval architect, Federal Shipbuilding & Dry Dock Co., Kearny, N. J.; E. C. Gillette, superintendent naval construction, bureau of lighthouses; W. B. Caswell, hull inspector, Southern Pacific Co., New York; W. R. Bean, assistant naval architect, New York Shipbuilding Corp., Camden, N. J.; J. W. Hudson, naval architect, Sun Shipbuilding & Dry Dock Co., Chester, Pa.; A. B. Brown, naval architect, Sparrows Point plant, Bethlehem Shipbuilding Corp. Ltd., Sparrows Point, Md.; Walter L. Green Jr., superintending engineer, Luckenbach Steamship Co., Inc., Brooklyn, N. Y., and George Levering, chief draftsman, William Cramp & Sons Ship & Engine Building Co., Philadelphia.

On July 23, a committee on "Piping" held a meeting. This committee will study existing specifications for piping required for ships, and develop and

recommend marine standards specifications where present measures can not be co-ordinated or do not cover the subject. This committee includes: John F. Metten, chief engineer, William Cramp & Sons Ship & Engine Building Co., Philadelphia; W. W. Smith, chief engineer, Federal Shipbuilding & Dry Dock Co., Kearny, N. J.; H. E. Brelsford, chief of technical section, maintenance and repair department, Emergency Fleet corporation, New York; R. Warriner, chief engineer, Bethlehem Shipbuilding Corp., Ltd., Quincy, Mass.; John E. Burkhardt, chief engineer, Bath Iron Works, Ltd., Bath, Me.; James P. Roe, general superintendent, Reading Iron Co., Reading, Pa.; W. R. Webster, vice president Bridgeport Brass Co., Bridgeport, Conn.; F. N. Speller, metallurgical engineer, National Tube Co., Pittsburgh; Jacob L. Bergvall, surveyor, American Bureau of Shipping, New York; Capt. Q. B. Newman, engineer in chief, coast guard; Lieut. Commander C. S. Gillette, U. S. N.; I. J. Fairchild, bureau of standards, also representing federal specifications board; Capt. Henry M. Seely, supervising inspector, steamboat inspection service, New York; W. L. Green Jr., Brooklyn, N. Y.; Frank Van Vleck, supervising marine engineer, office of the quartermaster general, U. S. A.

On July 24 a session was to be held by the committee on "Marine Joiner Hardware and Skylight Lifting Gears." This committee is headed by Joshua W. Atlee of the Cramp shipyards; and the personnel includes E. L. Langworthy of Adams & Westlake Co., Philadelphia; I. J. Fairchild of the bureau of standards; M. R. McCausland, president of the Norwalk Lock Co., South Norwalk, Conn.; Theodore C. Ulmer, president of Theo-

dore C. Ulmer, Inc., Philadelphia; R. B. Cherry of Sargent & Co., New Haven, Conn.; H. A. Taylor, assistant general manager of P. & F. Corbin, New Britain, Conn.; H. B. Plumb, president Eagle Lock Co., New York City; Howard E. Cornell, naval architect, Philadelphia; Edgar Harrison, New York Shipbuilding Corp., Camden, N. J.; W. W. Stevenson, joiner department, Sun Shipbuilding & Dry Dock Co., A. D. Woods, naval architect; Emergency Fleet corp., New York; A. B. Brown, Bethlehem Shipbuilding Corp., Ltd., Sparrows Point, Md.; Walter L. Green Jr., Luckenbach Steamship Co., Brooklyn, N. Y.; Lieut. Commander F. A. Hunnewell, constructor, coast guard; C. Christoffersen, hull engineer, Gibbs Bros., Inc., New York; and H. S. Getty, president, H. S. Getty Co., Philadelphia.

Committee on Manifolds

On the same day, the committee on "Manifolds,—suction and discharge—and Pipe Flanges," whose studies will be aimed at the establishment of standards for marine installations of these commodities, held its meeting. The chairman of this committee is R. Warriner, chief engineer of the Bethlehem Shipbuilding Corp., Ltd., Quincy, Mass.; and the personnel includes: H. E. Fromme, chief engineer, Consolidated Shipbuilding Corp., Morris Heights, N. Y.; Lieut. Commander C. S. Gillette, U. S. N.; S. Aitken, vice president Moore & McCormack Co., New York; E. W. Sniffen, Newport News Shipbuilding & Dry Dock Co., Newport News, Va.; I. J. Fairchild, bureau of standards; H. E. Brelsford, chief of technical section, Emergency Fleet corporation, New York; Ernest Fils, Robins Dry Dock & Repair Co., Brooklyn; Capt. H. M. Seely, steamboat inspection service; J. F. Metten, chief engineer, Cramp shipyards, Philadelphia; J. L. Bergvall, New York; and W. S. Newell, engineering works manager, Bath Iron Works, Bath, Me.

On July 25, two meetings were held, one of the committee on "Hose-fire, steam and oil"; and the other on "Care and Maintenance of Hull and Fittings." The former is headed by E. L. Lasier, materials engineer, Emergency Fleet corporation; and the members are L. G. Buckwalter, New York Shipbuilding Corp., Camden, N. J.; P. L. Wormeley, bureau of standard; S. D. McComb, Marine Office of America, New York; C. J. Krieger, Underwriters' Laboratories, New York; Capt. H. M. Seely; H. C. E. Meyer, chief engineer, Gibbs Bros. Inc.; D. A. Whamond, New York & Porto Rico Steamship Co., New York; E. G. Tuck,

chief surveyor, of the American Bureau of Shipping; and a representative of the Rubber Association of America.

The committee on care and maintenance of hull is headed by Col. R. M. Watkins, manager of the operating department of the Emergency Fleet corporation, New York. Its personnel includes Capt. H. M. Seely; W. B. Caswell, Southern Pacific Co.; Capt. Frank Downs port captain, Standard Oil Co. of New Jersey; Capt. H. L. Wyman, U. S. N.; L. D. Shuman, U. S. District Engineer's office, Philadelphia; A. D. Woods, Emergency Fleet corporation; S. D. McComb; Capt. William Park, general superintendent of Clyde-Mallory Lines, New York, and F. D. Cahan, American Bureau of Shipping, New York.

Three other committees had met earlier. A subject committee on insulation of piping and machinery met under the chairmanship of James B. Dunlop, chief surveyor of the American Bureau of Shipping. Prevention of the loss of heat and insulation of cold storage piping were studied. Other members of this committee include H. P. Barnes Jr., manager of Keasbey & Mattison Co., Philadelphia; B. C. McClure, general manager of the insulation and power specialty department of Johns Manville, Inc., New York; John P. Du Bois, sales manager of Ehret Magnesia Mfg. Co., Inc., Valley Forge, Pa.; John F. Metten, chief engineer of William Cramp & Sons Ship & Engine Building Co.; M. L. Bullard, president of P. S. Thorsen, Inc., Brooklyn, N. Y.; and W. L. Creemers, district manager of Philip Carey Co., Philadelphia.

Boiler Committee

A committee on the care and operation of boilers is also headed by Mr. Dunlop. This committee includes James MacDonald, supervising local manager of maintenance and repair department, Fleet corporation, Philadelphia; Joseph Wengland, assistant superintending engineer of the Southern Pacific Co., New York; A. A. Howitz, chief engineer, Sun Shipbuilding & Dry Dock Co., Chester, Pa.; G. H. Gaskin, supervising engineer of the International Mercantile Marine Co., New York, and Paul A. Hansen, chief draftsman, New York Shipbuilding Corp., Camden, N. J.

The committee to consider the design of condenser tube ferrules comprises: R. Warriner, chief engineer, Bethlehem Shipbuilding Corp., Quincy, Mass.; M. L. Katzenstein, manager marine department, Worthington Pump & Machinery Corp., New York; S. P. Gledhill, port engineer, Barber Steamship lines, New York; F. C. Williams, supervising engineer, Cosmopolitan Shipping Co., New

York; M. L. Sperry Jr., Scovill Mfg Co., Waterbury, Conn.; H. E. Brelsford, chief of technical section, Emergency Fleet corporation, New York; Alexander D. Bailey, superintendent of generating stations, Commonwealth Edison Co., Chicago; C. F. Hurshfeld, Detroit Edison Co., Detroit; and G. L. Kothny, executive engineer, C. H. Wheeler Mfg. Co., Philadelphia.

Marine Superheaters for River Boats

The Superheater Co., 17 East Forty-second street, New York, has recently completed the preparation of an interesting, illustrated pamphlet on superheated steam for river boats. The first three pages are devoted to a non-technical but at the same time accurate, clear and especially readable account of the reasons for greatly improved fuel economics possible with the use of high degree superheat. Detailed reasons for the exceptionally high saving in the application of superheat to various types of river boats is then taken up with a number of such boats shown in the accompanying illustrations. Types of engines used on river boats such as the single expansion long stroke poppet valve, it is pointed out, are particularly benefited by the use of high degree superheat. Also limiting conditions in space, weight, etc., have had a tendency to reduce the size of boilers to a minimum so that the additional boiler capacity obtained by use of superheat is especially important.

A detailed description is given of the company's superheaters for Mississippi river types of boilers, with illustration of a typical layout and of details of the superheater such as the heater elements, the forged return bend, ball joints, soot blowers and lubricating oil atomizer. Operation of the superheated steamboat is touched upon, but it is pointed out that such operation differs in no material respect from that of a saturated steam job.

Toward the end of the pamphlet trial data and indicator cards are reproduced for two typical river boat installations showing marked savings in fuel consumption after the installation of high degree superheaters.

The entire bulletin shows careful preparation and all engineers will find it of value as a discussion of superheated steam of genuine interest and worthy of serious attention.

Bids were opened July 21 by the United States engineer office at San Francisco for a light draft, wooden hull snagboat to be called the YUBA.

Big Motorship for Henry Ford-IV

Complete Radio Equipment Is Provided Offering Unusual Facilities for Communication Between Ship and Shore

BY GEORGE E. COLE

RECENT issues of MARINE REVIEW have, in a most interesting manner emphasized and described in detail the structural and engineering features of the motorships BENSON FORD and HENRY FORD II, now about completed for the Ford Motor Co. as bulk carriers on the Great Lakes. As devices of the most modern and approved type have been installed to facilitate efficient handling of ship and cargo, and every safeguard to secure the safety of life and property provided, it is thought, a brief description of the radio equipment will be of more than passing interest. This apparatus like the ships, represents the latest achievement of engineers, who are devoting themselves to the perfection of practical radio as applied to commercial marine communications.

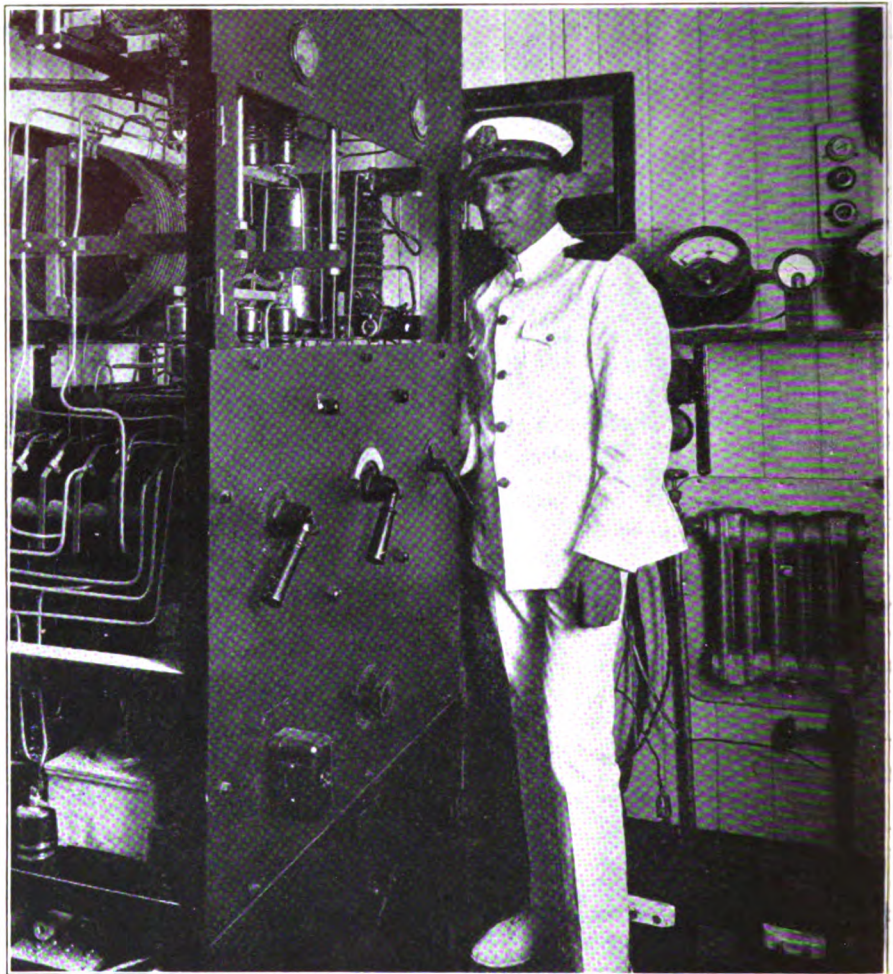
The transmitter is manufactured by the General Electric Co. for the Radio Corp. of America. The unit is self-contained with all controls and connections accessible from the front and delivers upward of one kilowatt into the antenna. Continuous wave (C.W.), interrupted continuous wave (I.C.W.) or telephone are available, special attention in design and assembly having been given to conditions of shipboard operation. For telegraphy by C. W. or I.C.W., four 250-watt vacuum tubes are used as oscillators. For speech, two 250-watt power tubes are employed as oscillators, and two to provide modulation, together with a voice amplifier tube rated at 50 watts. For operation on damped wave (I.C.W.) a motor drive interrupter is inserted in the grid circuit. This device gives the equivalent response at the receiving station, of a 500 cycle spark note and is thrown into the circuit automatically by a control mounted on the front. The I.C.W. type of emission is employed in communication with stations not equipped for straight C. W. reception. The unit is mounted on an angle iron frame with metal front and wire mesh sides and top, and is absolutely silent in operation.

Circuits for use of the apparatus as a radio telephone transmitter are set entirely by throwing a single switch on the front and means are provided for remote control enabling the captain to communicate with passing ships or shore from his cabin by radiophone. The extension station has complete control of the transmitter by means of a small

switching unit designed especially for mounting in bulkhead or on a desk, and an ordinary desk telephone set is the only conspicuous object.

The power equipment operates from the ship's supply, 240 volt, direct current, to a 3-unit motor generator set consisting of one $6\frac{1}{4}$ horsepower direct

controls for this machine are mounted on the operator's desk control panel which is a duplicate of that in the extension station previously mentioned and either may be operated independently of the other. Relays are provided which will automatically stop the machine in event of voltage failure or of any overload.



TRANSMITTER ABOARD AMERICAN LINER AMERICA WITH SIDE AND FRONT REMOVED TO SHOW CONTROLS AND INTERIOR CONSTRUCTION.
E. M. BLACK, SENIOR RADIO OFFICER, IN CHARGE

current motor, direct-connected to one kilowatt, direct current generator, 2000 volt, excited from a $\frac{7}{8}$ kilowatt double current generator, delivering 2.6 ampere direct current at 125 volts, and 10 amperes at 88 volts alternating current. These motor generators are designed especially to withstand pitching and rolling of the vessel and are equipped with speed regulators which give a filament and plate supply unaffected by variations in primary supply voltage. Con-

The wave lengths are set for 600, 706, 800 and 1875 meters, corresponding to 500, 425, 375 and 160 kilocycles respectively, for continuous or interrupted continuous wave operation, and 909 meters or 329 kilocycles for telephone communication. To obtain 300 meters, 1000 kilocycles, as required by law, a $\frac{1}{2}$ kilowatt spark transmitter is installed. This also serves as an emergency auxiliary in event of complete failure of the main set which, in view of the pro-

The author, George E. Cole, is superintendent, Great Lakes division, Radio Corp. of America.



CAPTAIN RINDS (LEFT) OF THE AMERICAN LINER AMERICA WHO HAS PARTICIPATED IN EXTENSIVE RADIOPHONE TESTS BETWEEN HIS SHIP AND SHORE OFFICIALS. AT RIGHT IS G. HAROLD PORTER, GENERAL MARINE SUPERINTENDENT OF THE RADIO CORP. OF AMERICA

tective and safety devices provided, is a remote possibility. While it was possible to obtain the full band of wave lengths on the main transmitter, it was thought desirable to provide the auxiliary in the interests of greater efficiency and insurance against failure. This, by the way, is a feature of the ships themselves. Every possible contingency is provided for.

Modern receiving apparatus, employing vacuum tube detectors and amplifiers is installed, with provision for attaching radio frequency amplification equipment. Loud speaker reception can be had if at any time required. The receiving equipment was also made by the General Electric Co. for the Radio Corp. of America, and is a standard design of the most approved type.

The development of tube transmitters is a logical step in the advancement of the radio art, particularly as applied to marine communications, as it lends itself to a greater number of uses than any type heretofore discovered and does it with far greater efficiency. It not only makes radio telephony possible, but in addition to simplicity of control and silent operation has advantages over the old spark system of increased range on less power and greater selectivity in transmission and reception. This latter point is of particular value on the Great Lakes in view of the close proximity of broadcast telephone stations and many thousands of listeners whose enjoyment

of radio programs is oft-times ruined by spark transmitters on passing ships. For this reason, together with many other technical and public advantages, it has been proposed to abolish sparks by United States law and international agreement and definite steps in this direction have been made.

This type of radio apparatus is available in standard commercial forms, and shipping interests on the Great Lakes in particular have been quick to realize its superiority, for use on cargo or passenger ships, as the growing demand for the apparatus indicates. The new passenger liners GREATER DETROIT and GREATER BUFFALO of the Detroit &

Cleveland Navigation Co. are among several other lake vessels now, or to be, similarly equipped. Apparatus of the same design but of lower output is already in service on the steamers ONEIDA and ONONDAGA, the two vessels which the Ford Motor Co. recently acquired.

Storm Hits Shipyard

The destructive storm of June 28 which spread damage from Iowa to Pennsylvania, was especially devastating at Sandusky and Lorain, O. The big Lorain shipyard of the American Shipbuilding Co. suffered damage of from one-half to three-quarter million dollars. Most of the buildings were unroofed, some had their walls blown down. Most of the machinery was undamaged. A few lake vessels were crippled but the principal shipping damage was felt by the small craft.

Lake Men Build Hotel

Lake vessel men took part in the recent opening of Hotel Agate Bay, at Two Harbors, Minn. This city is one of the main ports for the shipment of iron ore and a community drive was carried through to build the badly needed hotel. The big, modern hotel now available at Two Harbors testifies to the active support of the iron ore, dock and shipping men of that city and to the support from many others in lake trade.

Wants Early Volumes of Marine Review

A SET of bound volumes of MARINE REVIEW, from Nos. 1 to 16 (prior to 1898) is being sought by the New York public library. The library's set otherwise is complete. Any subscriber who has these early volumes of MARINE REVIEW should write to the library, either offering the volumes as a present or at a reasonable price. The New York library is the most used library in the world. These earlier volumes added to the library will be permanently available for use.

Brief Summaries of Recent Maritime Casualties— A Record of Collisions, Wrecks, Fires and Losses

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Late Flashes On Marine Disasters

Brief Summaries of Recent Maritime Casualties—
A Record of Collisions, Wrecks, Fires and Losses

NAME	DATE	NATURE	PLACE	DAMAGE RESULTING	NAME	DATE	NATURE	PLACE	DAMAGE RESULTING
Naples Maru	June 14	Grounded	nr. Oland	Frpk. leak.	Sisak	June 12	Ashore	Guayaquil	Not stated
Nismaha	June 13	Disabled	nr. New Orleans	Eng. trbl.	Saarbrucken	June 12	Grounded	nr. Tapagadja	Not stated
Nipura	June 25	Aground	Nuevitas Harbor	None appar.	Seistan	June 13	Ashore	Hungkongchau	Not stated
Nephrite	June 12	Stranded	Peterhead	Lost prop., leak.	Sheffield	June 12	Collision	Antwerp	Not stated
Narwhal	July 3	Disabled	Mobile	Leaking	Samuel H. Squire	July 2	Collision	Rabbit Island	To bottom
North American	July 9	Ashore	Grays Reef	Undam.	St. Helena	June 18	Ashore	Stag Harbor	Prob. total loss
Otto	June 5	Fouled	Kaiser Wilhelm Canal	Slight Sunk	Silverway	June 29	Ashore	Warsaw Is.	Floated
Olga Elisabeth	June 4	Hvy. weather	North Sea	Pt. eng. shft.	Songma	July 1	Fire	San Francisco	Slight
Ormidale	June 12	Disabled	Panama	Not stated	Stockton	July 1	Aground	Puget Sound	Undam.
Orkney	June 13	Ashore	Simrishamn	Slight eng. trbl.	San Katz	June 30	Fire	Acushnet River	Destroyed
Oilfield	June 24	Disabled	Halifax	Floated	Scow No. 19	June 3	Collision	New York	Sunk
Owama Maru	June 20	Ashore	Yokohama		Shini Maru	June 9	Grounded	Wakamatsu	Afloat
Pakeha	June 6	Struck rock	Bluff	Leaky	St. Charles	June 8	Disabled	Penzance	Leaking
Pass of Brander	June 6	Grounded	Batou Sand	Undam.	Shogiku Maru No. 2	June 17	Ashore	W. Saghalien	Wrecked
Priscilla	June 5	Disabled	Baton Rouge	Bkhd. leak.	Sea Lass	June 27	Hit sub. obj.	Falmouth	Crankshaft
Port Adelaide	June 6	Hit brkwr.	Barry	To strbrd. side	Teresa Rosa	June 5	Not stated	Buenos Aires	Sunk
Potrerrillos	June 12	Stranded	Quiriquina	Total loss	The Lambs	June 24	Disabled	New York	Eng. trble.
Portuguese Prince	June 12	Disabled	Rosario	Shaft broke	Tremorvah	June 19	Collision	Adelaide	To plates & beams
Portmore	June 30	Aground	Savannah	Floated	Thistletoe	June 16	Collision	Buenos Aires	Slight
Pennsylvania	July 5	Storm	New York	Slight	Tremtide I	June 16	Disabled	Cuxhaven	Boiler
Petros	June 4	Disabled	Sulina	Lost anchor	Tamatsu Maru	June 15	Stranded	Saghalien	Not stated
Prince John	June 6	Grounded	Queen Charlotte Is.	Slight to engs.	Tempo	June 20	Stranded	Harlingen	Floated
Panama Transport	June 16	Disabled	Rosario	Lost anchor	Tirso	June 19	Stranded	Rona	Undam.
Prudentic	June 16	Grounded	Lerwick	Floated	Tjiondardi	June 20	Ashore	Banka Straits	Not stated
Pologne	June 25	Fouled stmr.	Hamburg	Undam.	Tuscan Star	June 26	Collision	N.W. Ostend	Heavy
Queen Alexandria	June 4	Grounded	Astoria	Undam.	Teggysmith	June 26	Disabled	Brunsbüttelkoog	Rudder
Robert E. Hopkins	June 13	Disabled	E. of Highlands	Eng. trbl.	Titania	June 26	Grounded	Buenos Aires	Remains
Royal Star	June 3	Fire	Antwerp	Not stated	Truxillo	July 8	Collision	New Orleans	Damaged
Rhexenor	May 31	Collision	Liverpool	Unknown	Truro Queen	July 10	Fog, ashore	Jonesport	Badly
Reykjavik	June 2	Ashore	Kristianopol	Afloat	Ucayali	June 11	Disabled	Guayaquil	Prop. broke
Redhall	June 12	Grounded	Whitby	Proceeded	Uga Maru	June 12	Grounded	Manila	Not stated
R. J. Paisley	June 23	Hit bridge	River Rouge	To 4 plates	Ursula Fischer	June 22	Fouled pier	Newcastle	Not stated
Roeman	June 27	Fire	Toledo	Destroyed	Urter	June 8	Ashore	Little Bras d'or	No danger
Rockaway	June 28	Fire	New York	Slight	Verbania	June 3	Disabled	St. John's	Engine
Red Feather	July 7	Rammed	New London	Sink. condi.	Vanadis	June 12	Stranded	Birkenhead	Floated
Retuerto	June 24	Struck pier	Huelva	To plates	Vitellia	June 16	Grounded	Calcutta	Slight to keels & rud.
Saskatoon	June 12	Collision	Welland Canal	Port bow; leak.	Waihemo	June 3	Grounded	Newcastle	Floated
Svarten	June 13	Ashore	N. Elsinore	Tank leak.	William F. Stifel	June 13	Aground	Milwaukee	Not dam.
Suricho	June 8	Disabled	At sea	Broke steer.	W. S. Mather	June 18	Hit dock	Pittsburgh	Not stated
Shinkai Maru	June 5	Stranded	nr. Saghalien	Not stated	Wynstone	June 4	Listed	St. Malmo	Not stated
Shenango	June 21	Collision	Schuykill River	To port side	White Rose	June 12	Collision	Bristol Channel	Sunk
Seythian	June 26	Collision	Rotterdam	To stem & bows	William de Besche	June 11	Hvy. weather	At sea	Bridge, etc.
Sharon	June 19	Collision	Mobile	Plates bent	W. J. Crosby	June 25	Ashore	Lake Superior	To 41 plates
Sund	June 11	Disabled	Vigo	Boil. leak.	West Neris	June 16	Hit pier	St. Thomas	To rud. plates
Sunheath	June 10	Fire	Karachi	Not stated	Weera	June 17	Ashore	Saltholm	Floated
Supportco	June 12	Disabled	Panama	Condens. & boil.	Yahiko Maru	June 6	Stranded	Straits of Hama	Abandoned
					Zeus	June 12	Disabled	Cadiz	To cir. pump

Navy Tells Plans for Completing Vessels

From its appropriation of \$280,664,000 for the fiscal year 1925, the navy department will spend \$8,340,000 in finishing ships now building. These include two airplane carriers, two light cruisers of the Detroit class, seven first-class submarines, three fleet submarines, two destroyer tenders, one submarine tender and one repair ship.

For its different establishments, the navy will spend the following sums:

Portsmouth, N. H., navy yard, \$40,000; Boston navy yard, \$220,000; New York navy yard, \$71,000; Philadelphia navy yard, \$50,000; Washington navy yard, \$50,000; Norfolk navy yard, \$50,000; Charleston, S. C., navy yard,

\$30,000; Mare Island navy yard, \$785,000; Puget Sound, \$350,000; naval station Guantanamo, \$14,000; naval station St. Thomas, V. I., \$3500; naval station Pearl Harbor, \$198,000; naval station Tutuila, \$87,000; naval station Guam, \$33,000; naval station Cavite, \$141,000; naval torpedo station Keyport, \$85,000; naval training station, San Diego, \$40,000; naval training station Great Lakes, \$115,000; naval fuel depot San Diego, \$60,000; submarine base Pearl Harbor, \$50,000; naval station San Diego, \$155,000; supply depot, Marine corps, San Francisco, \$500,000.

Other important items on the navy's budget expenditures for the coming year include \$3,300,000 for transport, \$3,900,000 for organizing naval reserve force, \$17,420,000 for engineering, \$15,-

435,000 for construction and repair; ordnance and ordnance stores, \$9,649,000; fuel and transportation, \$14,492,000, and aviation, \$15,100,000.

Increased depth over Grays Harbor bar is expected to be announced officially within a short time, following successful operations by the dredge CULEBRA. For many months, the maximum depth allowed deep sea carriers has been 23 feet 6 inches. The underwriters will permit a greater draft as soon as accurate surveys of the channel have been made. Grays Harbor shippers hope that this will enable large carriers to take full cargoes on Grays Harbor. Heretofore, it has been necessary for many vessels to complete elsewhere because of uncertainty of water depths.

Business News for the Marine Trade

Carnegie Steel Co. plans construction of river docks for the plant at Bellaire, O., according to reports from that city.

Seaboard Dredging Co., Tampa, Fla., has the contract for dredging a deep water channel along the Swann terminal property. As soon as the dredging is completed, wharves, warehouses, and other appurtenances will be constructed.

Steinway Holding Corp., Wilmington, Del., has been incorporated for \$20,000 to deal in boats, etc.

Jersey City Excursion Line, Inc., Jersey City, N. J., has been incorporated with \$100,000 capital stock, to conduct a passenger transportation business, by Joseph W. Marini, Cliffside, N. J.

Philadelphia & Cape May Excursion Co., Philadelphia, has been chartered with \$100,000 capitalization to conduct a business dealing in and using boats.

Winnipeg Steamship Co., North Tonawanda, N. Y., has been dissolved.

White Lake Boat Co., Montague, Mich., has been incorporated with \$2500 capital, to deal in boats and carry on a general woodworking business, by Albert Pack, Joseph Barteau and Ernest Hagelin.

Belle Isle Boat & Engine Co., Detroit, has increased its capital stock from \$15,000 to \$100,000.

American Boat Co., Detroit, with a capitalization of \$25,000, has been dissolved.

Valley Boat Co., Saginaw, Mich., has filed papers of dissolution. The company had a capitalization of \$10,000.

Venezuela Ports & Terminals Co., New York, has been incorporated for \$100,000 to construct piers and do other marine work.

Los Angeles Terminal Co., Wilmington, Del., has been incorporated with \$1,500,000 capital, to do a general business of wharfing ships.

Rice Bros., East Boothbay, Me., and T. H. Soule, South Freeport, Me., have been awarded government contracts to build 10 vessels at each yard.

The Boston & Halifax Steamship Co., Boston, has been incorporated for \$90,000 to operate a navigation line, with William H. Burton, Brookline, Mass., William C. Rice, Medford, Mass., and Chauncey W. Hood, Boston, as incorporators.

The Gulf Atlantic Transportation Co., Fort Myers, Fla., has been incorporated with \$25,000 capital stock to conduct a transportation business with Richard J. Clark, as president and J. P. Munch, treasurer.

Charles E. Ware Jr., formerly president of the Nawsco Lines, has established a new steamship agency in Boston, to be known as the Ware Shipping Co. with headquarters at 111 Summer street. The new company is to represent the Munson-McCormick line which is inaugurating a service from Boston to the ports of Los Angeles, San Francisco, Portland, Oreg., and Seattle. Regular sailing will be made from Boston twice a month.

The Continental Cargo Checking Co., 113 State street, Boston, has closed its office due to bankruptcy.

The Colby Steel & Engineering Co., Central building, Seattle, has purchased patents of the Barlow marine elevator and will manufacture that product.

General Steamship Co. plans opening its own offices in Los Angeles, with Daniel G. Cooke in charge of traffic and Capt. W. J. Stofen in charge of operations. S. L. Krieder formerly

was representative in Los Angeles for the General corporation.

Thomas James and Niel S. McNulty have organized a general steamship agency in Los Angeles under the name of James & McNulty, with offices in the Pacific Electric building, that city.

The International Freighting Corp. has been appointed Philadelphia agent for the Porto Rico-American Line, succeeding Geyelin & Co., in that capacity.

Crosby Marine Corp., Seattle, has started constructing a new wooden shipbuilding yard facing Salmon bay, located on the site of the wartime plant of Meacham & Babcock Shipbuilding Co.

Improvements to the port of San Francisco are expected to begin shortly following the arrangements for sale of a \$2,000,000 issue of harbor improvement bonds.

The Clyde Line, through its subsidiary, the Cherokee-Seminole Steamship Corp., has awarded contracts to the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., for two vessels, costing approximately \$4,000,000.

William Cramp & Sons Ship & Engine Building Co., Philadelphia, has been awarded a contract for a new \$5,000,000 liner for the Matson Navigation Co.

Edward T. Morse Jr. and Frank J. McConnell have been appointed receivers for the National Dry Dock & Repair Co., Staten Island, N. Y. The government has a claim for \$120,954 in back taxes. Liabilities are estimated at \$450,000 and assets at \$500,000.

United States coast guard service boats will be constructed by A. W. DeYoung, Alameda, Cal., and Lake Union Drydock & Machine Works, Seattle, the former company having booked a contract for ten at \$22,167 each and the latter having received orders for 15 at \$21,993 each.

Metropolitan Boat Repair & Supply Corp., New York, has been incorporated with a capital stock of \$15,000. D. J. Dorothy, J. J. and W. T. Flannery, were incorporators.

Barclay, Curle & Co., Ltd., Whiteinch, England, has been awarded a contract for constructing a motorship of 5000 tons gross, for Harris & Dixon, London.

The Black Diamond Steamship Corp., recently increased its capitalization from \$200,000 to \$400,000. The company was incorporated under Delaware laws.

Oceanic Steamship Co., San Francisco, plans expenditure of \$300,000 to \$400,000, for improvements of its passenger and cargo steamers SONOMA and VENTURA.

Fire in the shipbuilding yards at Portland, Oreg., recently damaged the river steamer SARAH DIXON of the Shaver Transportation Co., and caused loss to the yards and equipment.

Gulf Refining Co., Pittsburgh, has awarded contracts to Palmer's Shipbuilding & Iron Co., Ltd., England, for two oil-tank steamers of special type.

Cammell, Laird & Co., Ltd., England, has been awarded contracts for two steamers for the West Indies fruit trade.

Sale of the yard of Pusey & Jones, Gloucester City, N. J., at a bid of \$516,000 has been approved by Federal Judge Lynch, Newark. The plant was reported to have cost about \$5,000,000, when new. Henry K. Fort was the buyer.

Spedden Shipbuilding Co., Baltimore, has been awarded contracts for building a steel tug for the Grace Steamship Co., New York.

The rivers and harbors committee of the house of representatives, Washington, has approved the San Pedro and Long Beach, Cal., improvement program.

Plans are under way for rebuilding the Federal Shipbuilding Co. plants recently damaged by fire at Kearny, N. J.

Cohen's Forwarding Co., New York, has been chartered with \$5000 capitalization by S. Mastel, M. Rickman and H. Bogandoff.

Chalmers & Cartwright have been named agents at Portland, Oreg., for the Mexican Free Ports Steamship Line.

Atlantic Boat Yard Co., Miami, Fla., has increased its capital stock from \$20,000 to \$100,000. E. L. Hess is president.

The Marine Engine Works & Shipbuilding Corp. is the name of the new company organized and incorporated recently at Tarpon Springs, Fla., with \$25,000 capital. The company contemplates constructing a plant there for manufacture of the motors and general marine work. R. Kaminis is president, Minas P. Saris, vice president, C. G. Tulmaris, secretary and A. Kaminis, treasurer and general manager.

Ship Board Vessel Sales

LAKE FLAMBEAU, lake-type cargo, 4145 dead-weight tons, 2609 gross tons, built in 1919, sold July 7 for \$52,768 to the Seaboard & Gulf Steamship Co., New York.

New Trade Publications

STEAM PURIFIERS—Means for freeing steam from moisture and dirt and the necessity for such separation are discussed thoroughly in a booklet issued by the Andrews Bradshaw Co., Pittsburgh. A device manufactured by this company is designed to remove all moisture and impurities from steam and deliver it in a dry state. Illustrations to show the detrimental effects of impure steam on metallic parts of power plants indicate the necessity for such cleaning of steam.

ELECTRIC APPLIANCES—Circuit breakers, precision torsion balances and portable alternating current measuring instruments manufactured by the Roller-Smith Co., New York, are presented in three bulletins being sent out to users of electrical equipment.

SUPERHEATERS—Discussion of the value of superheat in steam is gone into in a booklet prepared by the Superheater Co., New York and Chicago. Various types of such equipment applicable to distinct installations of boilers are described. The product of the company for this purpose is explained.

HANDLING EQUIPMENT—Savings possible through adoption of trucks and lifting devices are shown by pictures, with a minimum of text, in a booklet by the Lakewood Engineering Co., Cleveland. Attention is drawn to the lessened number of men and decreased time necessary for various work which constitute a large saving in the average plant.

HAMMERS—Mechanical helpers for forging and all anvil work have replaced hand work in many shops. How this is done is described in a booklet by the Blacker Engineering Co., New York, in a catalog of its products. A power hammer, fitted with a head that travels over the face of the anvil allows the workman to have both hands free to handle the work and thus does away with the need of a helper. Various types of the machine are provided for different classes of work.